

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MAN 12,3 a  
1. Edition

En

Testoll-ISO 4113

PE 6 P 120 A 821 LS 409 RSV 500-750 P0/483

supersedes  
company MAN  
engine D 3256 BTXUE

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $2,8 - 2,9$  mm (from BDC)  
( $2,75 - 2,95$ )

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> / 100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve) mm
1	2	3	4	2	3	6
700	9,2-9,3	13,2 - 13,6	0,5(0,9)			
500	4,4-4,6	1,7 - 2,3	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

## B. Governor Settings

Upper rated speed			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
loose	800	0,3 - 1,0	-	-	-	ca. 21	500	4,5		
	x = 1,25						500	4,4-4,6		
ca. 29	8,2	750 - 755					520-550	= 2,0		
⑤	4,0	780 - 790								
	950	0,3 - 1,0								

The numbers denote the sequence of the tests

## C. Settings for Fuel Injection Pump with Fitted Governor

② Full-load stop		⑥ Rotational-speed limitat.	③a Fuel delivery characteristics		Starting fuel delivery idle		⑤a Idle stop	
Test oil temp 40°C (104°F)		Note: changed to ...	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
700	132,0-136,0 (129,0-139,0)	750-755 *	-	-	100	19,5 - 21,0 mm RW	-	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

5.82

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FZ

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①

# Test Specifications Fuel Injection Pumps ① and Governors

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WPP 001/4 MB 19,1 c

1. Edition

En

PE 12 P 100 A 320 LS 820 RQV 350-1100 PA370R

supersedes

company

Daimler-Benz

engine

OM 404

(370 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $\frac{3,40-3,50}{(3,35-3,55)}$  mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> /100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1080	11,5	10,4-10,6	0,3(0,6)			
350	(+0,1) 7,5-8,0	1,8- 2,3	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 68	1080 1350	15,2-17,8 0 - 1	-	-	-	ca. 17	100 350	mind. 8 6,4-6,6	300 800	0,4-1,4 4,8-5,4
ca. 65	10,5 4,5	1120-1130 1205-1235					520-580 = 2,0 700 0 - 1		1120	8,3
						③a			-	-

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
1080	104,0-107,0 (102,0-109,0)	1120-1130*	1220	4,5 mm RW dispersion max. 6	100 350 100-190 ( 90-200)	110 - 130 19 - 24		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

8.77

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# Test Specifications Fuel Injection Pumps ① and Governors

En

PE 6 P 110 A 720 RS 3003 RQV 250-1100 PA 183 R

supersedes

company

Scania

engine

D 11

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $3,0 + 0,1$  mm (from BDC)  $( + 0,15 )$   
 $( - 0,05 )$

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	11,3 - 12,1	0,5			2,5±0,1** (max. 2,2-2,9)
600	9	4,7 - 5,9				
	12	11,3 - 12,8				
	15	16,7 - 18,4				
200	9	3,5 - 4,5				

Adjust the fuel delivery from each outlet according to the values in

\*\* In the case of greater dispersion alter the delivery-valve spring pre-tension accordingly.

## B. Governor Settings

RQV .. 183

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel ①	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm/rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1120 1200 1300 1410	15,0-17,6 9,2-13,6 1,0- 7,6 0	-	-	-	ca. 10	150 250 400 500	6,5-8,0 3,6-6,1 1,1-2,4 0	1120	8,3

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
1100	141,0-143,0	1135-1145*	600	143,0-147,0	100	240,0-290,0		
			1200	43,0- 53,0	225	12,0- 16,0		
(increase by ± 2,0 cm <sup>3</sup> !)			dispersion max. 4		dispersion max. 2		**	

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ① and Governors

11.74  
VDT-WPP 001/4 SCA 11,0 o  
1. Edition

En

PE 6 P 110 A 720 RS 3004 RQV 250-1100 PA 184 R  
Adjustment test - pressure drop - n = 500 r/min:  
Setting 332-348 mm Hg  
0.45-0.47 bar = 0.1 mm control-rod travel decrease  
Measurement 150-190 mm Hg  
0.21-0.26 bar = 2.0 mm control-rod travel decrease

supersedes

company

engine

Scania  
DS 11 LB 80

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

+ 0,15  
(- 0,05)

Port closing at prestroke 3,0 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	13,4 - 14,0	0,6			2,5 ± 0,1* (max. 2,2-2,9)
600	9	5,2 - 6,6				
	12	12,1 - 13,8				
200	15	16,9 - 18,8				
	9	3,5 - 4,7				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

RQV .. 184 R

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 66	1150	16,0-19,0	-	-	-	ca. 10	100	6,3-7,9	1170	8,3
	1440	0					250	4,8-6,4		
ca. 62	1100	15,0-17,4					400	2,5-3,8		
	1200	8,4-12,3					550	1,0-2,4		
	1300	1,0- 6,4					680	0		
	1400	0								

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1100	0,6 bar 182,0-184,0	1120	600	0,6 bar 183,0-187,0 0 bar	100	155,0-175,0		
			500	128,0-132,0	225	11,0- 13,0 dispersion max. 2)*		
					1200	34,0- 38,0 dispersion max. 4		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps ① and Governors

PES 8 P 120 A 321 RS 242 RQV 250·1150 PA 208 DR

supersedes 2.74  
company Berliet  
engine V 835

Values apply to fuel-injection test tubing  
8 x 2 x 1000

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,4+0,1 mm (from BDC) Cyl. 5

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	15,4 - 16,2	0,7			
600	9	5,2 - 6,2				
	12	9,5 - 11,0				
	15	16,0 - 17,7				
200	9	4,5 - 5,5				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel ①	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min ②a ②a	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm ④	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm ③	rev/min 10	mm 11
ca. 68	1170 1220 1300 1420	15,0-18,2 10,2-14,5 1,8-11,0 0	-	-	-	ca. 12	100 250 420 600 710	6,1-8,0 4,9-6,7 2,0-3,9 0,3-1,8 0	1190 1150 500	8,3 0 1,1-1,3
						③a				

Torque control travel a = 1,2 mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b ④a	Fuel delivery characteristics high idle speed ⑤a ⑤b		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤ Control rod travel	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	mm 9
1150	144,0-146,0	1260; 1290-1300*	1000 750 500	139,0-142,0 124,0-128,0 91,0- 97,0	100 250	mind. 90,0 13,0- 21,0		
					Charge-over point 200 - 130 min <sup>-1</sup>			

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps ① and Governors

PE 6 P 120 A 420 LS 245 RQV 300-1050 PA 239 KR  
Values apply to fuel-injection test tubing  
8 x 2 x 1000

supersedes  
company  
engine

Allis Chalmers  
Mark II

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	26,4-27,1	1,0	Manifold-pressure compensator adjustment n = 500 r/min pressure drop in bar: 0.98 - start = full-load control-rod travel minus 0.1-0.3 mm 0.31 - end = full-load control-rod travel minus 3.2-3.4 mm		
600	6	8,6- 9,8				
	12	26,3-28,1				
	15	33,8-36,2				
200	6	4,2- 5,2				

Adjust the fuel delivery from each outlet according to the values in  Gap\* in manifold-pressure compensator = 9.0-9.5 mm!

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1050 1100 1150 1210 1300	15,0-18,0 10,7-15,0 6,0-11,6 0 - 7 0	-	-	-	ca. 10	250 350 450 550	6,4-8,0 3,0-5,2 1,3-2,8 0		

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) 2		Rotational-speed limitation intermediate speed 4a	Fuel delivery characteristics high idle speed 5b		Starting fuel delivery idle switching point 6		Torque-control travel Control rod travel mm 5	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	mm 9
1050	1,3 bar 256,0-258,0	1080-1090*	900 700	1,3 bar 251,0-257,0 238,0-244,0	100 300	270,0-310,0 19,0- 25,0		
(increase by ± 1,0 cm <sup>3</sup> !)			500	0 bar 173,0-177,0	Change-over point 250-150 U/min			

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 120 A 720 LS 3806 RQ 250/1200 PA 356 R

supersedes

company

engine

FIAT

8260.02.405

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $3.50-3.60$  mm (from BDC)  
(3.45-3.65)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1200	9,3-9,4	17,3-17,7	0,5(0,9)			
250		2,8- 3,6	0,8(1,2)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Checking of slider PRG check		Full-load speed regulation				Idle speed regulation				Torque control	
rev/min 1	Control rod travel mm 2	Setting point rev/min 3	Control rod travel mm 4	Control rod travel mm 5	Test specifications rev/min 6	Setting point rev/min 7	Control rod travel mm 8	Test specifications rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
650	15,6-16,4	650	16,0	8,3	1245-1260	250	6,8	100	min.8,6		
1400	0 - 1,0			4,0	1285-1315			250	6,7-6,9		
								390-430=	2,0		

Torque-control travel on flyweight assembly dimension a =  mm

Speed regulation: At

1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delivery characteristics		Starting fuel delivery idle speed	
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes/mm 7
1200	173,0 - 177,0 (170,0 - 180,0)				100	14,0 - 15,0

Checking values in brackets

10.79

A12

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# Test Specifications Distributor-type Fuel-injection Pumps

En

VE 4/9 F 2400 R 66-10 Overflow temperature 45° C  
0 460 494 080

supersedes -  
company VWV  
engine 1,6

All test specifications are valid only for Bosch Fuel-injection Pump Test Benches and Testers

Test Instructions and Test Equipment

Pre-stroke setting

mm

see VDT-W-460/

1. Settings	Rot speed rev/min	Settings	Charge-air press. bar (kgf/cm <sup>2</sup> )	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	1500	3,1-3,5 mm		
1.2 Supply-pump pressure	1500	4,9-5,5 bar (kgf/cm <sup>2</sup> )		
1.3 Full-load delivery with charge-air pressure	1500	33,0-34,0 cm <sup>3</sup> /1000 strokes		2,5(0,3)
Full-load delivery without charge-air pressure	-	-- cm <sup>3</sup> /1000 strokes		
1.4 Idle regulation	415	6,0-10,0 cm <sup>3</sup> /1000 strokes		2,5(0,3)
1.5 Full-speed regulation	100	min. 38,0 cm <sup>3</sup> /1000 strokes		
1.6 Start	2600	11,0-17,0 cm <sup>3</sup> /1000 strokes		
1.7 Load-dependent port-closing	-	-		

Testoil-ISO 4113

## 2. Test Specifications checking values in brackets ( )

2.1 Timing device	n = rev/min mm	1000 1,4-2,2(1,1-2,5)	1500 (2,6-4,0)	2400 6,1-6,9(5,8-7,2)
2.2 Supply pump	n = rev/min bar (kgf/cm <sup>2</sup> )	400 2,1-2,7		2400 6,9-7,5
Overflow delivery	n = rev/min cm <sup>3</sup> /10 s	500 55-111(40-126)		2400 55-111(40-126)

## 2.3 Fuel deliveries

Speed control lever	Rot. speed rev/min	Fuel delivery cm <sup>3</sup> /1000 strokes	Charge-air press. bar (kgf/cm <sup>2</sup> )
End stop	2700	2,0-10,0 ( 2,0-10,0)	
	2600	(10,0-18,0)	
	2400	27,7-30,3 (26,7-31,3)	
	1500	(31,2-35,8)	
	600	21,5-24,5 (20,0-26,0)	
switch-off	2400	0	
Idle stop	1200	max. 3,0	
	600	max. 6,0	
	415	(4,0-12,0)	
End stop	400	min.17,0	
	500	max.23,0	
2.4 Solenoid	cut-in voltage	min.10V	
		rated voltage 12V	

## 3. Dimensions

Designation	for assembly and adjustment mm
K	3,2-3,4
KF	5,7-5,9
MS	1,3-1,5
SVS	max.2,5
FH*)	1,8-2,4
K K	18,4-20,4
L L	9,1-12,9

Observations  
\*) operating stroke  
(cold-start accel.)



# Test Specifications Fuel Injection Pumps ② and Governors

WPP 001/4 MB 19,1 L 1

1. Edition

En

PE 12 P 100 A 320 LS 828 RQ 1050 PA 310 R

12- 1 - 5 - 9 - 8 - 3 - 4 - 11 - 10- 2 - 6 - 7  
0-45 -60 -105-120-165-180-225-240-285-300-345° ± 0,5°

(± 0,75°)

supersedes

company

engine

Daimler-Benz  
OM 404  
276 kW (375 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $\begin{matrix} 3,20-3,30 \\ (3,15-3,35) \end{matrix}$  mm (from BDC) Cyl. 12

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,4+0,1	10,8-11,0	0,3(0,6)			
250	7,9-8,1	1,2- 1,8	0,3(0,5)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Checking of slider PRG check rev/min 1		Control rod travel mm 2		① Setting point rev/min 3		Control rod travel mm 4		Test specifications rev/min 5		④		Idle speed regulation Setting point rev/min 7		Control rod travel mm 8		Test specifications rev/min 9		Control rod travel mm 10		⑤		Torque control rev/min 11		Control rod travel mm 12		③		
-	-	-	-	-	-	11,4	1055-1060	4,9	1095-1105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Torque-control travel on flyweight assembly dimension a =  mm Speed regulation: At  1055-1060 min<sup>-1</sup> 1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) rev/min 1		cm <sup>3</sup> /-1000 strokes 2		②		Control rod stop rev/min 3		③a		Fuel delivery characteristics rev/min 4		cm <sup>3</sup> /-1000 strokes 5		③b		Starting fuel delivery idle speed rev/min 6		cm <sup>3</sup> /1000 strokes;/ mm Control rod travel 7		⑥	
100	108,0-110,0 (106,0-112,0)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100	19,5-21 mm RW High idle speed	1100	4,0(6,0) cm <sup>3</sup> /1000 dispersion	-	-

Checking values in brackets

4.81

A18

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# Test Specifications Fuel Injection Pumps ① and Governors

En

PE 6 P 110 A 320 RS 423

RQV 250-1250 PA 563

supersedes

company

engine

Volvo

TD 70 G

125 kW (170 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $3,0-3,1$   
(2,95-3,15) mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	9,0-9,1	7,2-7,4	0,4(0,8)			2,5 ± 0,1
250	4,5-4,7	0,9-1,3				(2,2 - 2,9)

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1250	15,2-17,8	-	-	-	ca.11	100	min.6,0	200	1,1-1,4
ca.64	8,0	1290-1300					250	4,5-4,7	550	3,5-3,7
	4,0	1360-1390					900	5,2-5,3		
	1450	0- 1,0					1250	7,9		

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) 2		Rotational-speed limitation intermediate speed 3	Fuel delivery characteristics high idle speed 5b		Starting fuel delivery idle switching point 6		Torque-control travel Control rod travel mm 9	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	mm 9
700	72,0-74,0 (69,0-77,0)	1290-1300*	-	-	100	140,0-170,0 / 20,0-21,0 mm RW	-	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 120 A 721 RS 287 RQ 250/1075 PA 388 DR

supersedes -  
company F B W  
engine EU3A/E3a  
(191 kW - 260 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at pre-stroke  $2,80-2,90$  mm (from BDC)  
 $(2,75-2,95)$

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1050	10,3 +0,1	19,2-19,6	0,5(0,8)			
250	7,4-7,6	4,5 - 5,1	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Checking of slider PRG check		Full-load speed regulation				Idle speed regulation				Torque control	
rev/min 1	Control rod travel mm 2	Setting point rev/min 3	Control rod travel mm 4	Control rod travel mm 5	Test specifications rev/min 6	Setting point rev/min 7	Control rod travel mm 8	Test specifications rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
600	15,6-16,4	600	16,0	9,3	1120-1135	250	7,5	100	min.9,0	1050	10,3-10,4
1250	0 - 1,0			4,0	1175-1206			250 400-	7,4-7,6 440=2,0	900 750 600	10,6-10,9 11,0-11,2 11,1-11,2

Torque-control travel on flyweight assembly dimension a  $0,65$  mm Speed regulation A1  $1120-1135 \text{ min}^{-1}$  1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delivery characteristics		Starting fuel delivery idle speed	
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes/mm 7
LDA 1050	0,7 bar 192,0-196,0 (189,0-199,0)	600	LDA 600	0,7 bar 163,0-169,0 (160,0-170,0)	100	150-170
			LDA 600	0 bar 120,0-124,0 (117,0-127,0)		

Checking values in brackets

# D. Adjustment Test for Manifold Pressure Compensator

Test at n = 600 rev/min decreasing pressure - in bar gauge pressure FBW 11,9 c

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
287 with 388 DR	0,7	0,36	11,1 - 11,2
		0,26	10,7 - 10,8
		0	9,8 - 10,0
			9,4 - 9,5

**Notes**

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

B2

**Testoil-ISO 4113**

En

# Test Specifications Fuel Injection Pumps ② and Governors

WPP 001/4 MB 9,6i  
3. Edition

En

PE 6 P 100 A 320 LS 841

RQ 300/1150 PA 187R (1)  
RQV300/1150 PA 227R (2)

supersedes 6.79  
company Daimler Benz  
engine OM 401  
150 kW (204 PS)

6 - 3 - 5 - 2 - 4 - 1  
0 -45 -120-165-240-285

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $\overset{(3,15-3,35)}{3,20-3,30}$  mm (from BDC) RW 10,5 Cyl. 6

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1150	11,8+0,1	11,5-11,7	0,3(0,6)	12,5+0,1	11,6-11,8	
300	7,6-7,8	1,2-1,8	0,3(0,5)	8,2-8,4	1,2-1,8	

Adjust the fuel delivery from each outlet according to the values in

RQ - 187 R

Testoil-ISO 4113

## B. Governor Settings

Checking of slider PRG check ①		Full-load speed regulation Setting point				Idle speed regulation Setting point				Torque control ③	
rev/min 1	Control rod travel mm 2	rev/min 3	Control rod travel mm 4	Control rod travel mm 5	rev/min 6	rev/min 7	Control rod travel mm 8	rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
600	13,8-14,6	600	14,2	10,8	1195-1210	300	7,7	100	min.9,2	1150	11,8-11,9
				4,0	1235-1265			300	7,6-7,8	600	11,8-12,0
1400	0 - 1							415-	455 = 2,0		

Torque-control travel on flyweight assembly dimension a =  mm

Speed regulation: At

1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) ②		Control rod stop ③a	Fuel delivery characteristics ③b		Starting fuel delivery Idle speed ⑥	
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes / mm 7
1150	115,0-117,0 (113,0-119,0)	500			100	110 - 130

Checking values in brackets

10.80

RQV...227

MB 9,6 i  
(2)

### B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1150 1400	15,2-17,8 0 - 1	-	-	-	ca. 18	100 300 740-800 =2,0	min. 9,8 8,2-8,4	300 800 1200	0,4-1,5 4,4-4,8 8,3
ca. 64	11,5 4,0	1190-1200 1265-1295				(3a)				

Torque control travel a = mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed	Starting fuel delivery Idle switching point	Torque-control travel
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	rev/min	Control rod travel mm
1	2	3	4	6	7
1150	115,0-117,0 (113,0-119,0)	1190-1200+		100	110 - 130
				100-220 (80-240)	

Checking values in brackets

\* 1 mm less control rod travel than co: 2

### D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing pressure - in bar gauge pressure  
increasing

Pump/governor	Setting	Measurement	Control rod travel-diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm

En

10.80

B4

Testoil-ISO 4113

34

# Test Specifications Distributor-Type Fuel Injection Pump

# 46

WPP 001/4 IHC 2,9 c 3

1. Edition

En

VA 3/100 H 1100 CR 62

0 460 303 144

supersedes

company

IHC

engine

D 179-WW 406 D

Setting of the pointer at a stroke of 1 mm in relation to outlet "A".

Pre-stroke setting 0,3 mm ± 0,04

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

Test Instructions and Test Equipment VDT-WPP 161/4 B

Pre-setting see reverse side

1. Settings	rev/min	Settings	Charge-air press kp/cm <sup>2</sup>	Difference in delivery cm <sup>3</sup>
1.1 Timing device travel	600	2,9-3,9 mm		
1.2 Supply pump pressure	600	4,0-4,4 kp/cm <sup>2</sup>		
1.3 Full-load delivery without charge-air pressure	800	66,0-67,0 cm <sup>3</sup> /1000 strokes		2,5
Full-load delivery with charge-air pressure	--	-- cm <sup>3</sup> /1000 strokes		
1.4 Idle speed regulation	375	12,0-18,0 cm <sup>3</sup> /1000 strokes		3,0
1.5 Start 196 bar	100	mind.90,0 cm <sup>3</sup> /1000 strokes		
1.6 Full-load speed regulation	1200	21,0-29,0 cm <sup>3</sup> /1000 strokes		

Testoil-ISO 4113

## 2. Test Specifications

Checking values in brackets

2.1 Timing device	rev/min	170-320(140-350)	400	600	850-1000
	mm	Start	1,2-2,2(0,9-2,5)	(2,6-4,2)	5,2-5,9(4,9-6,2)
2.2 Supply pump	rev/min	200		600	1100
	kp/cm <sup>2</sup>	1,6-2,1(1,4-2,3)		(3,8-4,6)	6,1-6,6(5,9-6,8)
Overflow delivery	rev/min	500			1100
	cm <sup>3</sup> /10 s	55-100(40-110)			55-100(40-110)

### 2.3 Fuel deliveries

Speed control lever	Delivery lever	rev/min	cm <sup>3</sup> /1000 strokes	Charge-air pressure kp/cm <sup>2</sup>
End stop	Full	1230-1280 (1210-1300)	0	
		1200	(20,0-30,0)	
		1130-1150	Start	
		1080	69,0-72,0	(68,0-73,0)
		800		(65,5-67,5)
		500	64,5-67,5	(63,5-68,5)
	Stop	1100	0	
Idle stop	Full	440-530 (420-550)	0	
		375	(11,0-19,0)	
	Start	100	mind.90,0	
End stop		220-300		

B7

**BOSCH**

Geschäftsbereich KH Kundendienst Kfz-Ausrüstung  
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B7

Angle to the stop-plate	Pre-setting dimensions
<p>Pump</p> <p><math>\alpha</math> <math>25 \pm 4^\circ</math></p> <p><math>\beta</math> <math>45 \pm 8^\circ</math></p> <p><math>\gamma</math> <math>30 - 8^\circ</math></p> <p><math>\delta</math> <math>60 \pm 8^\circ</math></p>	<p>Pump</p> <p>Dimension IV = 2,0 mm</p> <p>Dimension V = 24,6 mm</p>

Testoil-ISO 4113



# Test Specifications Fuel Injection Pumps ① and Governors

En

PE 6 P 120 A 720 RS 7001

RQV 250-1000 PA 472 R

supersedes

company: Scania

engine DS 11

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $\begin{matrix} 4,0-4,1 \\ (3,95-4,15) \end{matrix}$  mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,3+0,1	20,7-21,1	0,5(0,9)			
225	4,2-4,4	1,6- 2,0	0,5(0,8)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed				Lower rated speed			Sliding sleeve travel ①	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	①a	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm ④	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm ③	rev/min 10	mm 11
max.	1000	15,2-17,8	-	-	-	-	ca. 10	100	min. 6,0	200	1,0-1,2
ca. 60	11,3 4,0 1300	1040-1050 1135-1165 0 - 1,0						225	4,2-4,4	470	3,4-3,8
								290-350	= 2,0	730	5,1-5,3
										1000	7,7

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤b		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤		
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	④a	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA	0,7 bar 207,0-211,0 (204,0-214,0)	1040-1050*		LDA 600	0,7 bar 194,0-200,0 (191,0-203,0)	100	220,0-270,0 / 20,0-21,0 mm RW	-	-
				LDA 500	139,0-145,0 (136,0-148,0)				

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# D. Adjustment Test for Manifold Pressure Compensator

SCA 11,0 u 5 <sup>-2-</sup>

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure  
 increasing

Pump/governor	Setting	Measurement	Control rod travel- diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
PE6P ..RS7001 with ..PA472 R	0,7		12,3 - 12,4
		0	11,3 - 11,4
		0,45	12,0 - 12,1
		0,38	11,5 - 11,7

Notes:

(1) when n =

rev/min and  
gauge pressure =

bar (= maximum full-load control rod travel)

**Testoil-ISO 4113**

# Test Specifications Fuel Injection Pumps ① and Governors

En

PE 8 P 120 A 920/4 LS 7002 RQV 250-1000 PA 512

supersedes

5.82

company

Scania

engine

DS14

1 - 2 - 7 - 3 - 4 - 5 - 6 - 8 - je 45° ± 0,5 (± 0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

from FD 141: 5,0-5,1 to FD 052: 4,4 - 4,5  
Port closing at prestroke (4,95-5,15) mm (from BDC) (4,35-4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	13,2+0,1	21,2 - 21,4	0,5(0,9)			3,3 ± 0,1
225	4,7-4,9	1,4 - 1,7	0,5(0,8)			(3,0 - 3,5)
1000	13,2+0,1	C, col.4 u. 5				
500	11,3+0,1					

Adjust the fuel delivery from each outlet according to the values in .

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1000	15,2-17,8	-	-	-	ca. 10	100	min. 6,4	200	1,0-1,2
ca. 60	12,2	1040-1050					225	4,7-4,9	470	3,3-3,8
	4,0	1140-1170							730	5,1-5,3
	1300	0 - 1,0				255-365 3a			1000	7,7

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ④a	Fuel delivery characteristics ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA 700	0,7 bar 212,0-214,0 (209,0-217,0)	1040-1050*	LDA 1000	0,7 bar 222,0-230,0	100	230,0-280,0	-	-
			LDA 500	0 bar 144,0-148,0 (141,0-151,0)	225	14,0- 17,0		

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

# D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing pressure - in bar gauge pressure

SCA 14,2 a

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
..LS 7002 RQV..PA 512	0,7	0	13,2 - 13,3
		0,29	11,3 - 11,4
		0,38	12,0 - 12,2
			12,5 - 12,6

Notes:

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

Due to smoothing of the sealing edge, the initial spring tension with a new delivery-valve holder must be adjusted to 3,0 mm.

①

# Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4 SCA 14,2 a 2

1. Edition

En

PE 8 P 120 A 920/4 LS 7002

RQV 200-950 PA 547

supersedes

company

Scania

engine

DSC 1401

LKW T 142

1 - 2 - 7 - 3 - 4 - 5 - 6 - 8 je 45° ± 0,5 (± 0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

from FD 141: 5,0 - 5,1 to FD 052: 4,4 - 4,5 mm  
 Port closing at prestroke (4,95-5,15) mm (from BDC) (4,35-4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
950	13,8+0,1	20,6-21,4	0,5(0,9)			3,3 ± 0,1 (3,0 - 3,5)
225	4,4-4,6	0,8- 1,2				

Adjust the fuel delivery from each outlet according to the values in .

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3a 3b	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 4	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 3	rev/min 10	mm 11
max.	1070	15,2-17,8	-	-	-	ca.9	100	min.6,0	150	0,5-0,8
ca.59	12,8 4,0 1250	990-1000 1115-1145 0 - 1,0					225 310-370 = 2,0	4,4-4,6	420 680 950	2,9-3,4 4,7-4,9 7,1

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b ④a	Fuel delivery characteristics high idle speed ⑤a ⑤b		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤ Control rod travel mm	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	mm 9
LDA 950	0,7 bar 206,0-214,0 (204,0-216,0)	990-1000*	LDA 700	0,7 bar 202,0-204,0 (199,0-207,0)	100	230,0-280,0 / 20,0 - 21,0 mm RW	-	-
			LDA 500	0 bar 166,0-170,0 (163,0-173,0)				

Checking values in brackets

\* 1 mm less control rod travel than col. 2

B21

6.82

BOSCH

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321

# D. Adjustment Test for Manifold Pressure Compensator

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure  
 increasing

SCA 14,2 a 2

Pump/governor	Setting	Measurement	Control rod travel - diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
PE8P..LS 7002 with..PA 547	0,38		13,4 - 13,5
		0,7	13,8 - 13,9
		0	12,2 - 12,3
		0,26	12,5 - 12,7

Notes:

(1) when n =

rev/min and  
gauge pressure -

bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps ① and Governors

En

PE 6 P 120 A 720 RS 7001 RQV 200-1000 PA 539

supersedes

company:

Scania

engine:

DS 11 (1)

DSC 1101 (2)

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067  
All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

from FD 141: 5,0 - 5,1 to FD 052: 4,4 - 4,5 mm  
Port closing at prestroke (4,95 - 5,15) mm (from BDC) (4,35 - 4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> /100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	13,2+0,1	20,1 - 20,3	0,5(0,9)			3,3 ± 0,1
225	4,2-4,4	1,1 - 1,4	0,3(0,6)			(3,0 - 3,5)

Adjust the fuel delivery from each outlet according to the values in .

Testoil-ISO 4113

## B. Governor Settings

(1)

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1000	15,2-17,8	-	-	-	ca. 10	100	min. 5,8	150	0,5-0,8
ca. 62	12,2 4,0 1300	1040-1050 1145-1175 0 - 1,0				255-365	225	4,2-4,4	430 720 1000	3,0-3,5 5,0-5,2 7,7

Torque control travel a =  mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) 2		Rotational-speed limitation intermediate speed 4a	Fuel delivery characteristics high idle speed 5a		Starting fuel delivery idle switching point 6		Torque-control travel 5	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA	0,7 bar	1040-1050*	LDA	0,7 bar	100	220,0-270,0	-	-
700	201,0-203,0 (198,0-206,0)		1000	201,0-209,0 (199,0-211,0)		/ 20,0- 21,0 mm RW		
			LDA 500	0 bar 166,0-170,0 (163,0-173,0)				

Checking values in brackets

\* 1 mm less control rod travel than col. 2

### B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1070	15,2-17,8	-	-	-	ca.9	100	min.6,0	150	0,5-0,8
							225	4,3-4,5	430	3,0-3,5
ca.61	12,8 4,0 1300	1040-1050 1150-1180 0 - 1,0					310-370 = 2,0		720	5,0-5,2
									1000	7,7

Torque control travel a = mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
LDA	0,7 bar	1040-1050*	LDA	0,7 bar	100	220,0-270,0		
700	215,0-217,0 (212,0-220,0)		1000	219,0-227,0 (217,0-229,0)		/ 20,0 to 21,0 mm RW		
			LDA	0 bar				
			500	165,0-169,0 (162,0-172,0)				

Checking values in brackets

\* 1 mm less control rod travel than col: 2

### D. Adjustment Test for Manifold Pressure Compensator

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure increasing

Pump/governor	Setting	Measurement	Control rod travel-diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm
PE 6 P..RS 7001 with ..PA 539	(1). 0,44	0,7 0 0,28	12,8 - 12,9 13,2 - 13,3 11,6 - 11,7 12,0 - 12,2
	(2) 0,48	0,7 0 0,3	13,3 - 13,4 13,8 - 13,9 11,7 - 11,8 12,2 - 12,4

En



①

# Test Specifications Fuel Injection Pumps ① and Governors

40

WPP 001/4 VOL 7,0 k 2

1. Edition

En

PE 6 P 110 A 320 RS 423

RQV 250-1150 PA 435

supersedes

company

Volvo

engine

TD 70 G

130 kW

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke <sup>3,0-3,1</sup>  
(2,95-3,15) mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
700	10,0+0,1	8,6-8,8	0,4(0,8)			2,5 ± 0,1
250	4,5-4,7	0,9-1,3	0,3(0,6)			(2,2 - 2,9)

Adjust the fuel delivery from each outlet according to the values in 

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
max.	1150	15,2-17,8	-	-	-	ca. 10	100 250	min. 6,0 4,5-4,7	200 520 830 1150	1,1-1,4 3,5-3,7 5,1-5,3 8,0
ca. 66	9,0 4,0 1350	1190-1200 1260-1290 0 - 1,0					380-440	= 2,0		

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA 70G	0,7 bar 86,0-88,0 (83,0-91,0)	1190-1200	LDA 700	0 bar 77,0-80,0 (74,0-83,0)	100 250	140,0-170,0 / 20,0- 21,0 mm RW 11,0-15,0	-	-

Checking values in brackets

\* 1 mm less control rod travel than col. 2

5.82

C3

BOSCH

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C3

# D. Adjustment Test for Manifold Pressure Compensator

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure  
 increasing

VOL 7,0 k 2

Pump/governor	Setting	Measurement	Control rod travel
	Gauge pressure = bar	Gauge pressure = bar	mm (1) diminution difference
PE 6 P .. RS 423 with ..PA 435	0,7		10,0 - 10,1
		0	9,5 - 9,6
		0,36	9,8 - 9,9
		0,33	9,6 - 9,7

**Notes**

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

C4

**Testoil-ISO 4113**

En

C4

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 VOL 6,0 f  
7. Edition

En

PES 6 MW 100/320 RS 11 0 413 206 002

supersedes 6.81

RMW 300---1400 MW 18 0 420 093 010

company Volvo

engine D 60 A

1 - 5 - 3 - 6 - 2 - 4 = 0 - 60-120-180-240-300 ±0,5 (0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,40-2,50 mm (from BDC) 9 -12mm Control rod travel  
(2,35-2,55)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1400	9,0-9,2	7,6 - 7,8	0,3(0,15)			
300	5,7-5,9	1,7 - 1,9	0,3(0,5)			
Sect. C, col. 4,5						

See uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	2	3	4	5	6	7	8	9
	mm	rev/min		mm	rev/min		rev/min	mm
20	8,5	100	78±4	9,0-9,2	1400		100	20,5-21,5
	5,7-5,9	300		8,1	1400-1450		1300	9,0- 9,2
	**	325		4,0	1500-1520		1200	9,1- 9,3
		-		0,1-1,0	1610		1050	9,7- 9,9
	0 - 1,0	540	40+5		-			
							Switching point	
							100-230(80-250)	

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
Test oil temp. 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
1400	76,0-78,0 (75,0-79,0)	1440-1450* (1435-1455)	600	63,5-66,5 (62,5-67,5)	100	mind. 140	
					300	17,0-19,0 (16,0-20,0)	3,0 ( 5,0)

Checking values in brackets

less control rod travel than in Column 2

C11

5.82

**BOSCH**

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C11

1. Idle stage

4.0 + 0.25 mm

2. \*\* At this speed, set auxiliary idle spring such that contact is made.  
There must be no influence on idle delivery.
3. Control-rod travel of approx. 1 mm must be obtained when stopped.  
Check following adjustment of locking speed.

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,4 f  
9. Edition

En

PES 4 MW 55/320 RS 14  
RW 375/2200 MW 21

supersedes 2.79  
company Daimler-Benz  
engine OM 616-USA

1 - 3 - 4 - 2 = 0 - 90-180-270° ± 0,5° (0,75°)  
Note: Before starting testing, observe the  
important instructions on the reverse. See point 3!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers.

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC) 21 mm Control rod travel  
(1,65 - 1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,1-13,2	3,75-3,85	0,25(0,3)			
375	6,6-6,8	0,65-0,75	0,10(0,15)			
1600/2180	Sect. C,	col. 4,5	0,25(0,30)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel			
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel	
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm	
2	3		5	6		8	9		
30	① min.11	100-300	67±2	⑦ 12,4-12,6	2180	⑫ 100	⑬ 1600	20,5-21,5	
	② 6,6-6,8	375		⑧ 11,5	2280-2300			⑭ 1000	12,8-13,0
	③ **	385		⑨ 4,0	2670-2730			⑮ 2180	13,1-13,2
	④ -	-		⑩ 0 -1,0	2950				12,4-12,6
	⑤ max. 2	650-700		⑪ -	-				⑯ Switching point 270-320(250-340)

without altitude-pressure compensator

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery		Difference
Test oil temp. 40°C (104°F)			rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	
1	2	3	4	5	6	7	8
2180	39,0-42,0 (38,0-43,0)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	mind.56,0	6,0
			1000	37,5-38,5 (36,5-39,5)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5)
					2550	14,5-20,5 (13,5-21,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Testoil-ISO 4113

1. Testing of sections A, B and C should be done without the ADA aneroid box. When this test has been completed the ADA aneroid box is connected.

### Testing the governor with ADA-aneroid box (147)

Engine speed	Setting point	Control-rod travel reduction from full-load control-rod travel
1000 min <sup>-1</sup>	840 mbar (630 mm Hg)	0.9-1.1 (0.85-1.15) mm
	Checking point	
1000 min <sup>-1</sup>	913 mbar (685 mm Hg)	0.1 - 0.5 (0.05-0.55) mm

2. Pin projection =  $16.65 \pm 0.05$  mm.

### 3. Adjusting the idle stage

Text replaces section 4.1 of the test instructions.

Set the control lever to 30°.

Operate the fuel-injection pump at  $n = 800$  min<sup>-1</sup>.

Screw the spring retainer (torque-control capsule) or the driver with a pin wrench KDEP 1064/1 or a 1/2" hexagon-socket-screw-key so far that a control-rod travel of 1.2 - 1.5 mm is attained.

Further test steps see Test Instructions VDT-W-420/300 En.

4. ++ At this engine speed exceed the control-rod travel by  $0.4 + 0.1$  mm. Idle delivery must not be affected.
5. Adjustment angle: Stop ... idle = 35°, idle ... full load = 39°.
6. Sensing lever adjustment: Set the sensing lever at  $n = 375$  min<sup>-1</sup> (control lever in full-load position). At this speed the control-rod travel must exceed the full-load control-rod travel at  $n = 1000$  min<sup>-1</sup> by 0.2 - 0.5 (0.1 - 0.6 mm) mm.
7. Check the pneumatic shut-off!

Control lever in idle position. Operate the fuel-injection pump at  $n = 375$  min<sup>-1</sup>.

At  $p_{\text{ü}} = 450$  mbar (338 mm Hg) (vacuum) the control-rod must quickly return to control-rod travel 0 mm.

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 3,0 h  
3. Edition

En

PES 5 MW 55 / 320 RS 12  
RW 350/2200 MW 26

supersedes 11.77  
company Daimler-Benz  
engine OM 617

1 - 2 - 4 - 5 - 3 - = 0 - 72 - 144 - 216 - 288 ± 0,5° (0,75°)

See page 2

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70-1,80 mm (from BDC) 21 mm Control rod travel  
(1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,5+0,1	3,75-3,85	0,25(0,3)			
350	6,4-6,6	0,65-0,75	0,10(0,15)			
1600/2180	Sect. C, col. 4,5		0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed	Rotational speed	Control rod travel	
1	mm	rev/min	4	mm	rev/min	7	8	9
30	min. 11	100-250	68±4	12,3-12,5	2180	100	20,5-21,5	
	6,4-6,6	350		11,4	2280-2300	1600	12,9-13,1	
	**	360		4,0	2670-2730	1000	13,5-13,6	
	-	-		0-1,0	2950	2180	12,3-12,5	
	max. 2	650-700		-	-			
						Switching point		
						270-320(250-340)		

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	39,0-41,0 (38,0-42,0)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	mind. 56,0	6,0
			1000	37,5-38,5 (36,5-39,5)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5)
					1550	14,5-20,5 (13,5-21,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Testoil-ISO 4113

Notes:

1. Guide-sleeve idle travel  $6.75 \pm 0.25$  mm
2. \*\* At this speed, override control-rod travel by  $0.4 \pm 0.1$  mm.  
There must be no influence on idle delivery.
3. Sensing-lever setting: at  $n = 1000 \text{ min}^{-1}$ , max. 0.5 mm control-rod travel may be subtracted with the sensing lever.  
(Adjustment aid for fuel-delivery characteristics)
4. Idle - full load = 34 - 42 degrees advance-angle range must be complied with.
5. Pneumatic shut-off device:

Control lever in idle position. Drive fuel-injection pump with  $n = 350 \text{ min}^{-1}$ . Control rod must rapidly assume 0 mm control-rod travel at  $P = 450 \text{ mbar}$  (338 mmHg) (vacuum).



# Test Specifications Fuel Injection Pumps and Governors

PES 5 MW 55/320 RS 12 RW 250/2200 MW 20

supersedes 8.77  
company Daimler-Benz  
engine OM 617 (Sweden)

Cam sequence and angular spacing:

1-2-4-5-3--0-72-144-216-288° See page 2

Angular cam spacing tolerance  $\pm 0,5$  ( $0,75^\circ$ )

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,7-1,8 mm (from BDC) 21,0mm Control rod travel  
(1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,5	3,75-3,85	0,25(0,3)			
350	+ 0,1 6,5 ± 0,1	0,65-0,75	0,1(0,15)			
1600) 2180)--	Sect. C,	col. 4,5	0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
30	① min.11 ② 6,4-6,6 ③ ** ④ - - - ⑤ max. 2	150-220 350 360 - - 650-700	68±	⑦ 12,4±0,1 ⑧ 11,4 ⑨ 4,0 ⑩ max. 1 ⑪	2180 2280-2300 2670-2730 2850-2950		⑫ 100 ⑬ 1600 ⑭ 1000 ⑮ 2180	20,5-21,5 12,9-13,1 13,5-13,6 12,3-12,5
							⑯ Switching point 270-320 (250-340)	

Testoil-ISO 4113

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑰		Full-load speed regulation ⑱a	Variations in fuel delivery ⑰		Starting fuel delivery Idle ⑰		Difference	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes	
1	2	3	4	5	6	7	8	
1000	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600 2180	39,0-41,0 (38,0-42,0) 39,0-41,0 (38,0-42,0)	100 350 2550	min.56,0 6,5-7,5 (6,0-8,0) 14,5-20,5 (13,5-21,5)	6,0 1,0 1,5 2,5 3,0	⑲a ⑲b ⑲c ⑲d

Checking values in brackets

less control rod travel than in Column 2

Ca9

Note:

1. Sleeve idle-speed travel =  $6.75 \pm 0.25$  mm
2. Advance-angle range, idle speed to full-load =  $34 \dots 42^\circ$
3. \*\* (3) At this rotational speed applying force, increase the control-rod travel by  $0.4 \pm 0.1$  mm. In doing so, the idle delivery must not be affected!
4. With  $n = 1000 \text{ min}^{-1}$  (speed-control lever in full-load position), the control-rod travel can be reduced by a max. of 0.5 mm using the sensing pin.  
(Fuel delivery adjustment aid.)
5. Test the pneumatic cut-off:  
Control lever in the idle position. Drive the injection pump at  $n = 350 \text{ min}^{-1}$ . At  $p_u = 450 \text{ bar}$  (338mm Hg) (vacuum), the control rod must quickly return to the travel position 0 mm.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 4 MW 55/320 RS 17  
RW 375/2250 MW 23 (MW 24)  
1-3-4-2 = 0-90-180-270° ± 0,50° (0,75°)  
See page 2

supersedes 10.77  
company Daimler-Benz  
engine OM 616

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70-1,80 mm (from BDC) 21 mm Control rod travel  
(1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,4±0,1	3,75-3,85	0,25(0,3)			
375	6,6±0,1	0,65-0,75	0,1 (0,15)			
1600/2200	-Sect. 0, col. 4,5		0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel			
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Rotational speed rev/min	Control rod travel mm		
1	2	3	4	5	6	7	8	9	
①	min. 11	100-300	68±4	⑦	12,7-12,9	2200	⑫	100	10,5-21,5
②	6,5-6,7	375		⑧	11,8	2330-2350	⑬	1600	12,9-13,1
③	**	385		⑨	4,0	2750-2840	⑭	1000	13,4-13,5
④	-	-		⑩	0-1,0	2950		2200	12,7-12,9
⑤	max. 2	650-700		⑪			⑯	Switching point 270-320 (250-340)	

Testoil-ISO 4113

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery idle (18)		Difference
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	39,5-41,5 (38,5-42,5)	2330-2350* (2325-2355)	1600	39,5-41,5 (38,5-42,5)	100	mind. 53,0	6,0 (12a)
			1000	37,5-38,5 (36,5-39,5)	375	6,5-7,5 (6,0-8,0)	1,0 (1,5) (15)
					2600	14,5-20,5 (13,5-21,5)	2,5 (3,0) (16)

Checking values in brackets

less control rod travel than in Column 2

Notes:

1. Idle guide-sleeve travel =  $6.75 \pm 0.25$  mm
2. Idle - full load advance-angle range  $34 - 42^\circ$
3. Sensing-lever setting: set lever at  $n = 1000 \text{ min}^{-1}$ .  
Control lever in full-load position.
- 4 \*\* At appropriate speed, override control-rod travel by  $0.4 \pm 0.1$  mm; there must be no effect on idle delivery.
5. Test pneumatic shut-off:  
Control lever in idle position. Run fuel-injection pump at  $n = 375 \text{ min}^{-1}$ . Control rod must rapidly assume 0 mm control-rod travel at  $P_u = 450 \text{ mbar}$  (338 mmHg) (vacuum).

# Test Specifications Fuel Injection Pumps and Governors

En

PES5MW55/320RS12

RW350/2200 MW15

supersedes

2.79

Cam sequence and angular spacing: See page 2!

company

Daimler-Benz

1 - 2 - 4 - 3 = 0-72-144-216-288°

engine

OM 617

Angular cam spacing tolerance  $\pm 0,50^\circ (\pm 0,75^\circ)$

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $1,7 - 1,8$  mm (from BDC) Control rod travel  
(1,65- 1,85) 21,0mm

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,5	3,75-3,85	0,25(0,3)			
350	+ 0,1 6,5 ± 0,1	0,65-0,75	0,1 (0,15)			
1600, 2180	Sect. C,	col. 4,5	- 0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel			
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed	Rotational speed	Control rod travel		
1	2	3	4	5	6	7	8	9	
	mm	rev/min		mm	rev/min		rev/min	mm	
30	① min. 11 ② 6,4-6,6 ③ ** ④ - ⑤ max. 2	150-220 350 360 - 650-700	68±4	⑦ 12,4±0,1 ⑧ 11,4 ⑨ 4,0 ⑩ max. 1,0 ⑪	2180 2280-2300 2670-2730 2850-2950		⑫ 100 ⑬ 1600 ⑭ 1000 2180 Switching point ⑯ 270-320(250-340)	20,5-21,5 12,9-13,1 13,5-13,6 12,3-12,5	

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
Test oil temp. 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
1000	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	mind. 57,0	6,0
			2180	39,0-41,0 (38,0-42,0)	350	6,5 - 7,5 (6,0 - 8,0)	1,0 (1,5)
					2550	14,5 - 20,5 (13,5 - 21,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Note:

1. Sleeve idle-speed travel =  $6.75 \pm 0.25$  mm
2. Advance-angle range, idle speed to full-load =  $34 \dots 42^\circ$
3. \*\* (3) At this rotational speed applying force, increase the control-rod travel by  $0.4 \pm 0.1$  mm. In doing so, the idle delivery must not be affected!
4. With  $n = 1000 \text{ min}^{-1}$  (speed-control lever in full-load position), the control-rod travel can be reduced by a max. of 0.5 mm using the sensing pin.  
(Fuel delivery adjustment aid.)
5. Test the pneumatic cut-off:  
Control lever in the idle position. Drive the injection pump at  $n = 350 \text{ min}^{-1}$ . At  $p_u = 450 \text{ bar}$  (338mm Hg) (vacuum), the control rod must quickly return to the travel position 0 mm.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 5 MW 55/320 RS 4 RW 350/2200 MW 11

supersedes 7.77  
company Daimler-Benz  
engine OM 617

Cam sequence and angular spacing:

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288° ± 0,5° (± 0,75°)

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,7 - 1,8 mm (from BDC) Control rod travel (1,65- 1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
2180	12,1	3,7 - 3,8	0,25(0,3)			
350	6,5 (±0,1)	0,6 - 0,7	0,1 (0,15)			
1600, 1000)	- Sect. C, col. 4,5		- 0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Rotational speed rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	9
30	min. 11	150-220	ca. 68	12,1	2180		100	20,5-21,5
./.	6,5	340-360	(± 4)	11,1	2280-2300		1600	12,4-12,6
	**	360		6,8	2520-2580		1000	12,8-13,0
	-	---		max. 1	2800-2950			
	max. 2	650-700		-	---			
							6	Switching point *** ./.

Testoil-ISO 4113

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (2a)	Variations in fuel delivery (17)		Starting fuel delivery idle		Difference
Test of temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600	38,0-40,0 (37,0-41,0)	100	min. 57	6,0 (12a)
			1000	35,0-37,0 (34,0-38,0)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5) (15)
					2520-2580	15,5-17,5 (14,5-18,5)	2,5 (3,0) (16)

Checking values in brackets

less control rod travel than in Column 2

5.82

**BOSCH**

Geschäftsbereich KM Kundendienst Kfz-Ausrüstung  
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Extended text in VDT-WPP 211/7.

Section 4

To be given consideration prior to text for 4.13:

Set pointer plate (2) to "12 000 ft".

To be given consideration after text for 4.13:

Set pointer plate (2) to "0 ft".

Check switching point and compare to set value in test specification sheet.

At speed "0" and pointer plate (2) set to "12 000 ft", moving control lever forwards must cause starting control-rod travel (12) to be attained.

Section 6

To be given consideration following text for 2nd expanded text:

Check change in control-rod travel per detent position = 0.5 - 0.7 mm.

Test specification sheet MB 3.0 b - front -

Idle guide-sleeve travel = 6.75 + 0.25 mm

Idle:full load = 34 - 42° adjustment range must be complied with!

Load pick-up (increase in control-rod travel) when idling with  $n = 350 - 150 \text{ min}^{-1}$  must be between 4 - 5 mm control-rod travel!

Re (3) setting auxiliary idle spring \*\*

At this speed, override control-rod travel by 0.4+0.1 mm; there must be no effect on idle delivery!

Re (6) switching point \*\*\*

Setting 300 - 320 (280 - 340)  $\text{min}^{-1}$  with reduced-delivery stop set to "12 000 ft".

Test max. 310  $\text{min}^{-1}$  in "0 ft" setting of reduced-delivery stop



# Test Specifications Fuel Injection Pumps and Governors

En

PES 5 M 55 C 320 RS 105 0 400 075 999 0 400 075 997  
 RSF 350/2300 M 9  
 PES 5 M 55 C 320 RS 105 0 400 075 998 0 400 075 996  
 RSF 350/2300 M 10 See page 2!

supersedes 11.79  
 company Daimler-Benz  
 engine OM 617

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70-1,80 (1,65-1,85) mm (from BDC) 20,0mm Control rod travel

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,85 - 3,95	0,25(0,3)			
350	6,8-7,0	0,6 - 0,7	0,1 (0,15)			
1600	***		0,25(0,3)			
2200	***		0,25(0,3)			

\*\*\* Sect. C, col. 4,5

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
9-13 ①	10,5	250-300	50	⑦ 13,0-13,2	2200		⑫ 100	min.20,3
②	6,8-7,0	350		⑧ 9,5-9,9	2550		⑬ 1600	13,6-13,8
③	**	370		⑨ -	-		⑭ 1000	13,9-14,0
④	-	-		⑩ 0,0-1,0	2950			
⑤	2,5	720-820		⑪ -	-		⑥ Switching point	

Testoil-ISO 4113

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑰		Full-load speed regulation ⑱a	Variations in fuel delivery ⑰		Starting fuel delivery idle ⑱b		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	40,0-42,0 (39,0-43,0)	2550* RW=9,5-9,9	1600	39,5-41,5 (38,5-42,5)	100	min.52,0	6,0
			1000	38,5-39,5 (37,5-40,5)	350	6,0-7,0 (5,5-7,5)	1,0 (1,5)
					2550	23,5-27,5 (22,5-28,5)	2,5 RW- (3,0) See Point 8 a ⑱c

Checking values in brackets

\*3,4 less control rod travel than in Column 2

1. Angular cam spacing:

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288 ± 0,5 (0,75)

2. \*\* Auxiliary idle spring is to be adjusted at  $n = 370 \text{ min}^{-1}$  that the control-rod travel is exceeded by 0.1 - 0.2 mm.

3. Setting the idle control-lever position:

$n = 1000 \text{ min}^{-1}$ , control travel 1.9 - 2.0 mm

4. Checking the auxiliary idle spring shutoff:

Control-lever position =  $45^\circ$ . After the change-over point, the control lever does not alter its position until  $550 \text{ min}^{-1}$ .

Idle control-lever position =  $28^\circ$ . Speed range =  $350 - 450 \text{ min}^{-1}$ .

5. Checking the pneumatic shutoff aneroid box:

Lever at idle stop.

At  $n = 375 \text{ min}^{-1}$  and  $p_u = 450 \text{ mbar}$  (vacuum) (338 mm Hg) the control rod must return quickly to 0 mm travel position.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 55 C 320 RS 104 )  
 RSF 375/2300 M 12 ) 0 400 074 989 0 400 074 984  
 PES 4 M 55 C 320 RS 104 )  
 RSF 375/2300 M 11 ) 0 400 074 990 0 400 074 983  
 See page 2!

Supersedes 5.79  
 company Daimler Benz  
 engine OM 616

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC) 20 mm Control rod travel  
 (1,65 - 1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,85 - 3,95	0,25(0,30)			
375	6,7-6,9	0,7 - 0,8	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Rotational speed rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	9
11±2	11,0	250-300	50	13,0 <sup>+0,2</sup>	2200		100	min.20,3
	6,7-6,9	375		9,5-9,9	2550		1600	13,6-13,8
	**	395		-	-		1000	13,9-14,0
	--	-		0 - 1,0	2950			
	2,5	720-820		-	-			
								Switching point

Testoil-ISO 4113

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery Idle (18)		Difference
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	40,0-42,0 (39,0-43,0)	2550* RW=9,5-9,9	1600	39,5-41,5 (38,5-42,5)	100	min. 52,0	6,0 (12a)
			1000	38,5-39,5 (37,5-40,5)	375	7,0-8,0 (6,5-8,5)	1,0 (15)
					2550	23,5-27,5 (22,5-28,5)	2,5 See (16)
							(3,0) Point 8 a

Checking values in brackets

\*3,5 less control rod travel than in Column 2

4.80

# BOSCH

Geschäftsbereich KH. Kundendienst. Kfz-Ausrüstung  
 © 1980 by Robert Bosch GmbH, Postfach 50, D-7000 Stuttgart 1 Printed in the Federal Republic of Germany  
 Imprimé en République Fédérale d'Allemagne par Robert Bosch GmbH

1. Angular cam spacing:

$$1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 \pm 0,50 (0,75)$$

\*\*

2. Auxiliary idle spring is to be adjusted at  $n = 395 \text{ min}^{-1}$  that the control-rod travel is exceeded by 0.1 - 0.2 mm.

3. Setting the idle control-lever position:

$$n = 1000 \text{ min}^{-1}, \text{ control travel } 1.9 - 2.0 \text{ mm}$$

4. Checking the auxiliary idle spring shutoff:

Control-lever position =  $45^{\circ}$ . After the change-over point, the control lever does not alter its position until  $550 \text{ min}^{-1}$ .

Idle control-lever position =  $28^{\circ}$ . Speed range =  $350 - 450 \text{ min}^{-1}$ .

5. Checking the pneumatic shutoff aneroid box:

Lever at idle stop.

At  $n = 375 \text{ min}^{-1}$  and  $p_u = 450 \text{ mbar (vacuum)}$  (338 mm Hg) the control rod must return quickly to 0 mm travel position.

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,4 h

3. Edition

En

- 1. PES 4 M55C 320 RS 104 } 0 400 074 994 0 400 074 984  
RSF 375/2300 M 8
- 2. PES 4M55 C 320 RS 104 } 0 400 074 991 0 400 074 983  
RSF 375/2300 M 7

supersedes 2.79  
company Daimler Benz  
engine OM 616

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC) 20 mm Control rod travel  
(1,65 - 1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	13,9+0,1	3,85-3,95	0,25(0,3)			
375	6,7-6,9	0,7 - 0,8	0,1(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
11±2	11,0	250 - 300	50	13,0+0,2	2200		100	min.20,3
①	6,7-6,9	375	⑦	9,4-9,8	2550		1600	13,6-13,8
②	**	395	⑧	-	-		1000	13,9-14,0
③	-	-	⑨	0,0-1,0	2950		⑬	
④	2,5	720-820	⑩	-	-		⑭	
⑤			⑪				⑮	
							⑯	
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## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑰		Full-load speed regulation ⑱		Variations in fuel delivery ⑲		Starting fuel delivery idle		Difference
Test oil temp 40°C (104°F)								
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8	8
2200	40,0-42,0 (39,0-43,0)	2550*	1600	39,5-41,5 (38,5-42,5)	100	min.52,0		⑳
		RW=9,4-9,8	1000	38,5-39,5 (37,5-40,5)	375	7,0-8,0 (6,5-8,5)	1,0	㉑
					2550	22,5-26,5 (21,5-27,5)	2,5	㉒
							See	㉓
							(3,0) Point	㉔
							8 a	㉕

Checking values in brackets

\*3,5 less control rod travel than in Column 2

Testoil-ISO 4113

1. Angular cam spacing:

1 - 3 - 4 - 2 = 0 - 90 - 180 - 270  $\pm$  0,50 (0,75)

\*\*

2. Auxiliary idle spring is to be adjusted at  $n = 395 \text{ min}^{-1}$  that the control-rod travel is exceeded by 0.1 - 0.2 mm.

3. Setting the idle control-lever position:

$n = 1000 \text{ min}^{-1}$ , control travel 1.9 - 2.0 mm

4. Checking the auxiliary idle spring shutoff:

Control-lever position =  $45^{\circ}$ . After the change-over point, the control lever does not alter its position until  $550 \text{ min}^{-1}$ .

Idle control-lever position =  $28^{\circ}$ . Speed range =  $350 - 450 \text{ min}^{-1}$ .

5. Checking the pneumatic shutoff aneroid box:

Lever at idle stop.

At  $n = 305 \text{ min}^{-1}$  and  $p_u = 450 \text{ mbar}$  (vacuum) (338 mm Hg) the control rod must return quickly to 0 mm travel position.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 6 MW 100/320 RS 5 Z RWV 300-1400 MW 4  
See page 2!  
Angular cam spacing tolerance

supersedes 7.77  
company Volvo-Penta  
engine DAMB 60 A

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,5 - 2,6 mm (from BDC) 10,5mm Control rod travel  
(2,45- 2,65)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> /100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (compensating valve) mm 6
1400	10,6	8,9 - 9,1	0,35(0,6)			
300	(+0,1) 5,1 (±0,1)	0,9 - 1,3	0,35(0,55)			
800	Sect. C, col. 4,5		0,5 (0,7)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever 1	Control rod travel mm 2	Rotational speed rev/min 3	Degree of deflection of control lever 4	Control rod travel mm 5	Rotational speed rev/min 6	Rotational speed rev/min 8	Control rod travel mm 9	
26	① 8,5-9,5 ② 5,0-5,2 ③ with contact ④ 2,0 ⑤	100 300 310** 420 - 470	82±4	⑦ 10,6 ⑧ 9,6 ⑨ 4,0 ⑩ max. 1,0 ⑪	1400 1440-1450 1540-1580 1680 250-350	⑫ 100 ⑬ 1400 ⑭ 800 500 ⑥ Switching point 100-220(80-230)	20,5-21,5 10,6-10,7 10,8-11,0 10,1-10,3	

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery ⑰ Test oil temp 40°C (104°F)		Full-load speed regulation ⑱a	Variations in fuel delivery ⑰		Starting fuel delivery Idle ⑱b		Difference
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	cm <sup>3</sup> /1000 strokes 8
1400	89,9-91,9 (87,9-93,9)	1440-1450*	800	86,8-90,8 (84,8-92,8)	100	max. RW	⑲a
					300	9,8-13,8 (7,3-16,3)	3,5 (5,5) ⑲b

Checking values in brackets

less control rod travel than in Column 2

Note:

1. Idle guide-sleeve travel =  $4.25 \pm 0.1$
2. \*\* At this speed, override control-rod travel by  $0.6 \pm 0.1$  mm; there must be no effect on idle delivery.
3. Set cut-in point of maximum-speed control spring at  $CL = 40 \pm 5^\circ$ . There must be no uncontrolled stage.
4. Starting control-rod travel of approx. 21 mm must be attained when stopped.  
(Check following setting of locking speed)



# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 2,0 g 2

3. Edition

En

PES 4 M 50 C 320 RS 103 )  
RSF 375/2300 M 14 ) 0 400 074 987 Sales model  
0 400 074 985

supersedes 4.80  
company Daimler-Benz  
engine OM 615

See page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers.

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC) 20 mm Control rod travel  
(1,65 - 1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	11,9+0,1	2,90-3,00	0,25(0,3)			
375	6,9-7,1	0,65-0,75	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
13-17	11,5	250-300	50	11,2+0,2	2200		100min	20,3
①	6,9-7,1	375	⑦	8,1-8,5	2550		1600	11,5-11,7
②	**	395	⑧	-	-		1000	11,9-12,0
③	-	-	⑨	0 - 1,0	2950		⑬	
④	2,5	720-820	⑩	-	-		⑭	
⑤			⑪				⑮	
							⑯	Switching point

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery Idle		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	31,0-33,0 (30,0-34,0)	2550* RW=8,1-8,5	1600	29,5-31,5 (28,5-32,5) 29,0-30,0 (28,0-31,0)	100	min. 54,0	6,0
					375	5,4-7,5 (6,0-8,0)	1,0 (1,5)
					2550	17,5-21,5 (16,5-22,5)	2,5 (3,0)
							See Point 8 a

Checking values in brackets

1e: control rod travel than in Column 2

D13

5.82

**BOSCH**

Geschäftsbereich KH Kundendienst, Kfz-Ausrüstung  
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1. \*\* Auxiliary idle spring is to be adjusted at  $n = 370 \text{ min}^{-1}$  that the control-rod travel is exceeded by 0.1 - 0.2 mm.
2. Setting the idle control-lever position:  
 $n = 1000 \text{ min}^{-1}$ , control travel 1.9 - 2.0 mm
3. Checking the auxiliary idle spring shutoff:  
Control-lever position =  $45^\circ$ . After the change-over point, the control lever does not alter its position until  $550 \text{ min}^{-1}$ .  
Idle control-lever position =  $28^\circ$ . Speed range =  $350 - 450 \text{ min}^{-1}$ .
4. Checking the pneumatic shutoff aneroid box:  
Lever at idle stop.  
At  $n = 375 \text{ min}^{-1}$  and  $p_u = 450 \text{ mbar}$  (vacuum) (338 mm Hg) the control rod must return quickly to 0 mm travel position.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 5 MW 55/320 RS 3  
RS 3

RW 350/2200 MW 2  
MW 10

supersedes 7.77  
company Daimler-Benz  
engine OM 617

Cam sequence and angular cam spring

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288° See page 2!

Angular cam spacing tolerance  $\pm 0,5^\circ (\pm 0,75^\circ)$

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,7 - 1,8 mm (from BDC) max. Control rod travel (1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
2180	12,4	3,9 - 4,0	0,25(0,3)			
350	6,5 ( $\pm 0,1$ )	0,6 - 0,7	0,1(0,15)			
1600 ) 1000	Sect. C,	col. 4,5	--- 0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed	Rotational speed	Control rod travel	
1	mm	rev/min	4	mm	rev/min	7	9	
	2	3		5	6	8		
30	(1) min. 11	150-220	ca. 68	(7) 12,4	2180	(12) 100	20,5-21,5	
	(2) 6,5	340-360	( $\pm 4$ )	(8) 11,4	2280-2300	(13) 1600	12,9-13,1	
	(3) **	360		(9) 6,8	2520-2580	(14) 1000	13,4-13,6	
	(4) -	- - -		(10) max. 1	2800-2950			
	(5) max. 2	650-700		(11) -	- - -			
						(6) Switching point		
						250-300(225-325)		

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery idle (18)		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	39,0-40,0 (38,0-41,0)	2280-2300* (2275-2305)	1600	39,0-41,0 (38,0-42,0)	100	min. 57	6,0 (12a)
			1000	36,5-38,5 (35,5-41,0)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5) (15)
					2520-2580:	15,5-17,5 (14,5-18,5)	2,5 (3,0) (16)

Checking values in brackets

less control rod travel than in Column 2

Note:

1. Sleeve idle-speed travel =  $6.75 + 0.25$  mm
2. Advance-angle range, idle speed to full-load =  $34 \dots 42^\circ$
3. \*\* (3) At this rotational speed applying force, increase the control-rod travel by  $0.4 + 0.1$  mm. In doing so, the idle delivery must not be affected!
4. VDT-WPP 211/7 (3.75) supersedes adjustment instructions on MB 3.0 a (9.74)!

# Test Specifications Fuel Injection Pumps and Governors

En

PES 5 MW 55/320 RS 4

RW 350/2200 MW 3

supersedes

7.77

company

Daimler-Benz

engine

OM 617

See page 2!

Cam sequence and angular cam spring

1 - 2 - 4 - 5 - 3 = 0 - 72 - 144 - 216 - 288 ± 0,5° (±0,75°)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke **1,7 - 1,8** mm (from BDC) **max.** Control rod travel  
(1,65-1,85)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
2180	12,1	3,7-3,8	0,25(0,3)			
350	6,5 (±0,1)	0,6-0,7	0,1(0,15)			
1600 1000	(Sect. C, col. 4,5)		0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm
1	2	3	4	5	6	7	8	9
30	10,5-11,5	150-220	ca. 68	12,1	2180		100	20,5-21,5
1	6,5	340-360	(±)	11,1	2280-2300		1600	12,4-12,6
2	**	360		6,8	2520-2580		1000	12,8-13,0
3	-	---		max. 1	2800-2950			
4	max. 2	650-700						
5								
							6	Switching point 250-300(225-325)

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	37,5-38,5 (36,5-39,5)	2280-2300* (2275-2305)	1600	38,0-40,0 (37,0-41,0)	100	mind. 57	6,0
			1000	35,0-37,0 (34,0-38,0)	350	6,5-7,5 (6,0-8,0)	1,0 (1,5)
					1520-2580	15,5-17,5 (14,5-18,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Notes:

1. Sliding-sleeve idle travel =  $6.75 + 0.25$  mm
2. Advance angle in idle - full load range =  $34 - 42^\circ$
3. \*\* 3 At this engine speed, exceed control-rod travel by  $0.4+0.1$  mm; idle delivery must not be affected!
4. \*\*\*- "12.1 mm" - is the full-load control-rod travel set in Section A, 1-3.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 50 C 320 RS 103 )  
RSF 375/2300 M 13 ) 0 400 074 986  
See page 2!  
Sales model 0 400 074 986

supersedes 3.79  
company Daimler-Benz  
engine OM 615

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 1,70 - 1,80 mm (from BDC)  
(1,65 - 1,85) 20 mm Control rod travel

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	12,7+0,1	3,20 - 3,30	0,25(0,30)			
375	6,9-7,1	0,65 - 0,75	0,1(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min		Rotational speed rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
13-17	11,5	250-300	50	12,0+0,2	2200		100	min.20,3
	6,9-7,1	375		8,6-9,0	2550		1600	12,4-12,6
	**	395		-	-		1000	12,7-12,8
	-	-		0-1,0	2950			
	2,5	720-820		-	-			
							6	Switching point

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery idle (18)		Difference
Test oil temp. 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	33,5-35,5 (32,5-36,5)	2550* RW=8,6-9,0	1600	32,5-34,5 (31,5-35,5)	100	min.54,0	6,0 (12a)
			1000	32,0-33,0 (31,0-34,0)	375	6,5-7,5 (6,0-8,0)	1,0 (15)
					2550	20,5-24,5 (19,5-25,5)	2,5 (3,0) See point 8a (16)

Checking values in brackets

\*3,9 less control rod travel than in Column 2

1. \*\* Position the idle-speed auxiliary spring at  $n = 395 \text{ min}^{-1}$  so that the control-rod travel is forced further by 0.1 - 0.2 mm.
2. Adjusting the idle control-lever position:  
At  $1000 \text{ min}^{-1}$ , control-rod travel 1.9 - 2.0 mm
3. Testing the idle-speed auxiliary spring shutoff  
Control-lever position  $45^\circ$ . No change in control-rod travel after switching point up to  $550 \text{ min}^{-1}$ .  
Control-lever position  $28^\circ$ . Rotational-speed range  $350 \text{ min}^{-1}$  -  $450 \text{ min}^{-1}$ .
4. Testing the pneumatic shutoff box  
Control lever against idle stop.  
At  $n = 375 \text{ min}^{-1}$  and 450 mbar (vacuum) (338 mmHg) the control rod must move briskly to RW (control-rod travel) = 0 mm.



# Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 50 C 320 RS 103  
RSF 375/ 2300 M 5  
Komb.Nr. 0 400 074 996  
1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 ± 0,5(0,75°)  
Sales model 0 400 074 985

supersedes 2.79  
company Daimler Benz  
engine OM 615

See page 2!  
All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $1,70-1,80$  mm (from BDC)  $20$  mm Control rod travel  
 $(1,65-1,85)$

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	11,9±0,1	2,90-3,00	0,25(0,3)			
375	6,9-7,1	0,65-0,75	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed <sup>1</sup> rev/min		Rotational speed <sup>1</sup> rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
13+4	① 11-11,5 ② 6,9-7,1 ③ ** ④ - ⑤ 2,5	250-300 375 395 - 720-820	50	⑦ 11,2-11,4 ⑧ 8,1-8,5 ⑨ - ⑩ 0 - 1,0 ⑪ -	2200 2550 - 2950 -		⑫ 100 ⑬ 1600 ⑭ 1000	min.20,3 11,5-11,7 11,9-12,0
							⑥ Switching point	

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
rev/min	cm <sup>3</sup> /1000 strokes		rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	
1	2	3	4	5	6	7	8
2200	31,0-33,0 (30,0-34,0)	2550* RW=8,1-8,5	1600 1000	29,5-31,5 (28,5-32,5) 29,0-30,0 (28,0-31,0)	100 375 2550	min. 54,0 6,5-7,5 (6,0-8,0) 17,5-21,5 (16,5-22,5)	1,0 (1,5) 2,5 (3,0) See point 8a
							⑫a ⑬ ⑭ ⑮

Checking values in brackets

\*3,0 less control rod travel than in Column 2

1. \*\* Position the idle-speed auxiliary spring at  $n = 395 \text{ min}^{-1}$  so that the control-rod travel is forced further by 0.1 - 0.2 mm.
2. Adjusting the idle control-lever position:  
At  $1000 \text{ min}^{-1}$ , control-rod travel 1.9 - 2.0 mm
3. Testing the idle-speed auxiliary spring shutoff  
Control-lever position  $45^\circ$ . No change in control-rod travel after switching point up to  $550 \text{ min}^{-1}$ .  
Control-lever position  $28^\circ$ . Rotational-speed range  $350 \text{ min}^{-1}$  -  $450 \text{ min}^{-1}$ .
4. Testing the pneumatic shutoff box  
Control lever against idle stop.  
At  $n = 375 \text{ min}^{-1}$  and 450 mbar (vacuum) (338 mmHg) the control rod must move briskly to RW (control-rod travel) = 0 mm.

# Test Specifications Fuel Injection Pumps and Governors

En

PES 4 M 50 C 320 RS 103  
RSF 375/2300 M 3  
Sales model 0 400 074 986  
Kombination Nr. 0 400 074 998  
1 - 3 - 4 - 2 = 0 - 90 - 180 - 270 ± 0,5(0,75°)  
See page 2!

supersedes 2.79  
company Daimler Benz  
engine OM 615

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $1,70 - 1,80$  mm (from BDC) Control rod travel  $20$  mm  
 $(1,65 - 1,85)$

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	12,7+0,1	3,20 - 3,30	0,25(0,3)			
375	6,9-7,1	0,65 - 0,75	0,10(0,15)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed	Rotational speed	Control rod travel	
1	mm	rev/min	4	mm	rev/min	rev/min	mm	
	2	3		5	6	7	8	9
13+4	① 11-11,5 ② 6,9-7,1 ③ ** ④ - ⑤ 2,5	250-300 375 395 - 720-820	50	⑦ 12,0-12,2 ⑧ 8,6-9,0 ⑨ - ⑩ 0-1,0 ⑪ -	2200 2550 - 2950 -	⑫ 100 ⑬ 1600 ⑭ 1000	min.20,3 12,4-12,6 12,7-12,8	
						⑥ Switching point		

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2200	33,5-35,5 (32,5-36,5)	2550* RW=8,6-9,0	1600 1000	32,5-34,5 (31,5-35,5) 32,0-33,0 (31,0-34,0)	100 375 2550	min.54,0 6,5-7,5 (6,0-8,0) 20,5-24,5 (19,5-25,5)	⑫ <sub>a</sub> 1,0 (1,5) 2,5 see (3,0) Point 8a ⑬ ⑭ ⑮ ⑯

Checking values in brackets

\*ca 3,5 less control rod travel than in Column 2

Testoil-ISO 4113

1. \*\* Position the idle-speed auxiliary spring at  $n = 395 \text{ min}^{-1}$  so that the control-rod travel is forced further by 0.1 - 0.2 mm.
2. Adjusting the idle control-lever position:  
At  $1000 \text{ min}^{-1}$ , control-rod travel 1.9 - 2.0 mm
3. Testing the idle-speed auxiliary spring shutoff  
Control-lever position  $45^{\circ}$ . No change in control-rod travel after switching point up to  $550 \text{ min}^{-1}$ .  
Control-lever position  $28^{\circ}$ . Rotational-speed range  $350 \text{ min}^{-1}$  -  $450 \text{ min}^{-1}$ .
4. Testing the pneumatic shutoff box  
Control lever against idle stop.  
At  $n = 375 \text{ min}^{-1}$  and 450 mbar (vacuum) (338 mmHg) the control rod must move briskly to RW (control-rod travel) = 0 mm.

# Test Specifications Fuel Injection Pumps (1A) and Governors

40

WPP 001/4

3. Edition

En

PE 6 A 95 D 412 RS2305

EP/RSV 250-1225 A1 B562DL

supersedes

7.78

company

BW

engine

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke (1,85-2,05) mm (from BDC)  
1,90-2,00

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre tensioning (torque control valve) mm
1	2	3	4	2	3	6
1200	12,2-12,3	9,4-9,6	0,3(0,6)			
250	8,0- 8,2	0,9-1,5	0,3(0,5)			
600	- - -	C, 4-5	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

1 Upper rated speed rev/min Degree of deflection of control lever	Control rod travel		Intermediate rated speed			4 Control lever deflection in degrees	Lower rated speed		3 Torque control	
	mm	mm rev/min	4	5	6		rev/min	mm	rev/min	mm
1	2	3				7	8	9	10	11 + 0,1
loose	800	0,3-1,0				ca.26	250	5,5		
	x	= 5,2					100	min.19	1225	12,2
ca.67	1265-1275=	11,2					250	5,9-6,1	800	12,7
2a	1290-1320=	5,0					420-480 =	2,0		
	1400	0,3- 1,0					600	0 - 1	600	12,7

The numbers denote the sequence of the tests

## C. Settings for Fuel Injection Pump with Fitted Governor

2b Full-load stop Test oil temp. 40°C (104°F)		6 Rotational-speed limit Note changed to 1 rev/min		3a Fuel delivery characteristics		Starting fuel delivery idle 5		4a Idle stop	
rev/min	cm <sup>3</sup> /1000 strokes	3	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm	
1	2		4	5	6	7	8	9	
LDA 1200	0,7 bar 92,5-89,5 (90,5-96,5)	1265-1275*	LDA 600	0,7 bar 88,0-91,0 (86,0-93,0)	100	mm RW 14,7-15,3			
			LDA 600	0 bar 67,0-70,0 (65,0-72,0)					

Checking values in brackets

\* 1 mm less control rod travel than col 2

E14

**BOSCH**

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EAU

4.80

# D. Adjustment Test for Manifold Pressure Compensator

Ppe 2305

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure  
 increasing

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel - diminution difference mm (1)
2305 / 562DL	0,68	0,22 0	12,5 - 12,6 12,3 - 12,4 11,2 - 11,4

**Notes**

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 120 A 720 RS 7001 RQ 250/1000 PA 615 (1)  
RQV 250 1000 PA 612 (2)

supersedes -  
company Scania  
engine DN 11  
151 kW (205PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

from FD 141: 5,0-5,1 to FD 052: 4,4 - 4,5 mm  
Port closing at prestroke (4,95-5,15) mm (from BDC) (4,35- 4,55)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	11,3±0,1	18,6 - 18,7	0,5(0,9)			3,3 ± 0,1**
250	4,0-4,2	0,9 - 1,3	0,5(0,8)			(3,0 - 3,5)

\*\* Due to smoothing of the sealing edge, the initial spring tension with a new delivery-valve holder must be adjusted to 3,0 -0,1 mm

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

..PA 615 (1)

Checking of slider PRG check rev/min 1		Full-load speed regulation Setting point rev/min 3				Idle speed regulation Setting point rev/min 7				Torque control rev/min 11	
Control rod travel mm 2	Control rod travel mm 4	Control rod travel mm 5	Test specifications rev/min 6	Control rod travel mm 8	Control rod travel mm 9	Control rod travel mm 10	Control rod travel mm 12				
600	15,6-16,4	600	16,0	10,3 4,0	1045-1060 1105-1135	250	4,1	100 250 300-340 = 2,0mm	min.5,6 4,0-4,2	-	-

Torque-control travel on flyweight assembly dimension a =  mm Speed regulation: At 1045-1060 min<sup>-1</sup> 1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) rev/min 1		Control rod stop rev/min 3		Fuel delivery characteristics rev/min 4		Starting fuel delivery Idle speed rev/min 6	
cm <sup>3</sup> /-1000 strokes 2	Control rod travel mm 3a	Control rod travel mm 3b	cm <sup>3</sup> /-1000 strokes 5	Control rod travel mm 6	Control rod travel mm 7		
1000	185,0-187,0 (182,0-190,0)	-	600	166,0-170,0 (163,0-173,0)	100	240,0-290,0 20-21 mmRW	

Checking values in brackets

### B. Governor Settings

..PA 612 (2)

SCA 11,0 u 2

1

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
max.	1000 1250	15,2-17,8 0 - 1,0	-	-	-	ca. 10	100 250	min. 5,6 4,0-4,2	200 500 800 1000	1,0-1,2 3,6-4,0 5,6-5,8 7,7
ca. 59	10,3 4,0	1040-1050 1120-1150				260-365				

Torque control travel a = mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery Idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1000	185,0-187,0 (182,0-190,0)	1040-1050*	600	166,0-170,0 (163,0-173,0)				

Checking values in brackets

\* 1 mm less control rod travel than coil 2

### D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing pressure - in bar gauge pressure  
increasing

Pump/governor	Setting	Measurement	Control rod travel-diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm

En



# Test Specifications Fuel Injection Pumps ② and Governors

PES 6 P 120 A 820 LS 3077 RQ 300/1100 PA 606

supercedes -  
company Daimler Benz  
engine OM 407 A  
206 kW(280 PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $4,0 - 4,1$   
 $(3,95-4,15)$  mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	12,0+0,1	18,3 - 18,5	0,5(0,9)			
300	5,0-5,2	1,4 - 2,2	0,8(1,2)			

Values only apply to test nozzle-and-holder assembly 1 688 901 019 and fuel-injection test tubing 1 680 750 067.

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Checking of slider PRG check ①		Full-load speed regulation Setting point ④				Idle speed regulation Setting point ⑤				Torque control ③	
rev/min 1	Control rod travel mm 2	rev/min 3	Control rod travel mm 4	Control rod travel mm 5	rev/min 6	rev/min 7	Control rod travel mm 8	rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12
650	19,2-20,8	650	20,0	11,0 4,0	1145-1160 1190-1220	300	4,9	100 300 360-400	min.6,5 4,8-5,0 =2,0	1100 1000 900	12,0+0,1 12,2+0,1 12,5+0,1

Torque-control travel on flyweight assembly dimension a = 0,2 mm      Speed regulation: At 1145-1160 min<sup>-1</sup>      1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F) ②		Control rod stop ③a	Fuel delivery characteristics ③b		Starting fuel delivery Idle speed ⑥	
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes/mm 7
LDA 1100	0,7 bar 183,0-185,0 (180,0-188,0)	-	LDA 600	0,7 bar 185,0-191,0 (182,0-194,0)	100	150,0-170,0
			LDA 500	0 bar 142,0-144,0 (139,0-147,0)		

Checking values in brackets

# D. Adjustment Test for Manifold Pressure Compensator

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure  
 increasing

MB 11,4 i 4

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel: diminution difference mm (1)
PES 6 P..LS 3077 / ..PA 606	0,42	0,70	12,2 - 12,3
		0	12,5 - 12,6
			10,7 - 10,8
		0,31	11,3 - 11,4

Notes:

(1) when n =

rev/min and gauge pressure =

bar (= maximum full-load control rod travel)

# Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 120 A 421 RS 237 RQ 300/1100 PA 193 DR  
RQV 250-1100 PA 194 DR

supersedes 1.73, 2.74  
company Saurer  
engine D 1 KT  
(290 PS)

1 - 4 - 2 - 6 - 3 - 5 je 60°

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC) Cyl. 6

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	24,9 - 25,6				
600	6	5,9 - 7,1				
	12	20,8 - 22,6				
	15	30,6 - 33,0				
200	6	3,7 - 4,7				

Adjust the fuel delivery from each outlet according to the values in

## B. Governor Settings

RQ..PA 193 D

Checking of slider FRG check		Full-load speed regulation				Idle speed regulation				Torque control					
①		Setting point		Test specifications		④		Setting point		Test specifications		⑤		③	
rev/min 1	Control rod travel mm 2	rev/min 3	Control rod travel mm 4	Control rod travel mm 5	rev/min 6	rev/min 7	Control rod travel mm 8	rev/min 9	Control rod travel mm 10	rev/min 11	Control rod travel mm 12				
650	15,7-16,3	650	16,0	1120	14,6-15,0	610	0	100	7,1-8,1	750	15,8-16,0				
				1160	8,0-13,6			250	5,3-7,4						
				1200	0- 1,8			350	3,2-5,4	1050	14,8-15,1				
				1270	0			510	0						

Torque-control travel on flyweight assembly dimension a = 0,35 mm

Speed regulation: At

1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delivery characteristics		Starting fuel delivery Idle speed	
②		③a	③b		⑥	
rev/min 1	cm <sup>3</sup> /-1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /-1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes/mm 7
LDA	0,7 bar		LDA	0,7 bar	100	220,0-240,0
1100	213,0-215,0		700	185,0-189,0		
		0 bar -- 2,1 + 0,1 mm RW less				
./.						

Checking values in brackets

10.75

Testoil-ISO 4113

### B. Governor Settings

RQV .. 194 D

Ppe 237

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 60	1100 1150 1200 1280 1360	15,0-18,0 11,0-15,0 6,6-11,8 0 - 6,2 0	-	-	-	ca. 12	180 250 350 490	6,4-8,0 3,7-6,1 1,9-3,3 0	1100	8,2
						(3a)				

Torque control travel a = 0 mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed	Starting fuel delivery idle switching point	Torque-control travel
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	rev/min	Control rod travel mm
1	2	3	4	6	7
LDA	0,7 bar	0,7 bar	LDA	100	216,0-236,0
1100	211,0-213,0	1130	1100	167,0-171,0	Change-over point 130-200 min <sup>-1</sup>

Checking values in brackets

\* 1 mm less control rod travel than col: 2

Testoil-ISO 4113

### D. Adjustment Test for Manifold Pressure Compensator

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure (1)  
 increasing pressure - in bar gauge pressure (2)

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel- diminution difference mm
237 / 193 D	0,46 - 0,50	0,10-0,18	- 0,1 mm (1) - 2,3 mm
237 / 194 D	0,09 - 0,11	0,24-0,30	ca. 1,4 (2)

En

1000

0,7

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 3,0 n  
2. Edition

En

PES 5 MW 55/320 RS 16  
RW 375/2200 MW 29  
0 403 245 015  
0 403 245 017 - Sales model  
See page 2!

supersedes 12.80  
company Daimler Benz  
engine OM 617 A

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,10-2,20 mm (from BDC) 21 mm Control rod travel  
(2,05-2,25)

without altitude-pressure compensator

Rotational speed	Control rod travel	Fuel delivery	Difference	Control rod travel	Fuel delivery	Spring pre tensioning (compensating valve)
rev/min	mm	cm <sup>3</sup> /100 strokes	cm <sup>3</sup> /100 strokes	mm	cm <sup>3</sup> /100 strokes	mm
1	2	3	4	2	3	6
1000	13,6+0,1	5,35-5,45	0,25(0,3)			
375	4,8-4,9	0,6-0,7	0,10(0,15)			
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel			
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed		Rotational speed	Control rod travel	
1	mm	rev/min	4	mm	rev/min	7	rev/min	mm	
1	2	3	4	5	6	7	8	9	
27-31	min. 11 max. 11 ** - -	100 320 375 - -	69	7 8 9 10 11	11,9-12,1 11,0 4,0 0,0-1,0	2180 2300-2320 2620-2720 2950	12 13 14 6	100 1600 1000 Switching point (250-340)	20,5-21,5 12,9-13,1 13,6-13,7

Testoil-ISO 4113

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery idle		Difference
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	50,0-52,0 (49,0-53,0)	2300-2320* (2290-2330)	1600	52,0-53,5 (51,0-54,5)	100min.	55,0	6,0 (12a)
			1000	53,5-54,5 (52,5-55,5)	375	6,0-7,0 (5,5-9,5)	1,0 (15)
					2550	24,0-27,0 (23,0-28,0)	2,5 (16)

Checking values in brackets

less control rod travel than in Column 2

# BOSCH

Geschäftsbereich KH, Kundendienst, Kfz-Ausrüstung.  
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Testing with ALDA

Point	min <sup>-1</sup>	cm <sup>3</sup> /1000 H	RW	Pressure (absolute)
18	1000	53,5 - 54,5 (52,5 - 55,5)	13,6 - 13,7	1733 mbar(1300 mmHg)
18a	*** 1000	42,5 - 44,5 (41,5 - 45,5)	-	1067 mbar( 800 mmHg)
19	2180	50,0 - 52,0 (49,0 - 53,0)	11,9 - 12,1	1733 mbar (1300 mmHg)
12a	100	min. 55	20,5 - 21,5	1733 mbar (1300 mmHg)
15	375	6,0 - 7,0 (5,5 - 9,5)	4,8 - 4,9	978 mbar (740 mmHg)

1. Adjusting the idle

Test supersedes Section 4.1 of test instructions VDT-W-420/300  
Suppl. 2, Ed. 2.

Set the control lever to an angle of 69°. Operate the fuel-injection pump at 1000 min<sup>-1</sup>.

Screw in the spring retainer until a control-rod travel of 13,6 - 13,7 mm is reached.

Set the control lever to an angle of 49°. Operate the fuel-injection pump at 1000 min<sup>-1</sup>. Control-rod travel 8,6 - 9,3 must be reached.

2. Adjusting the lower rated speed

Text supersedes Section 4.3 of test instructions VDT-W 420/300  
Suppl. 2, Ed. 2.

Operate the fuel-injection pump at  $n = 800 \text{ min}^{-1}$ . Take back the control lever until a control-rod travel of 1.0 - 1.3 mm is reached.

**Testoil-ISO 4113**

The resulting deflection of the control lever must be within the allowable tolerance. Fix the control lever in this position. Drive the fuel-injection pump at a speed according to Point 2 Section B of the test specification sheet. Set regulation at adjusting screw (28).

3. Adjusting the idle-speed auxiliary spring (70)

\*\* Position the idle-speed auxiliary spring in contact as the characteristic curve levels off at  $n=520-550 \text{ min}^{-1}$ .

4. Adjusting the sensing lever

Place the control lever against the full-load stop.

Operate the fuel-injection pump at  $n = 375 \text{ min}^{-1}$ . Adjust the sensing lever so that the control-rod travel is 0.1 (0.1 - 0.2) mm above the full-load control-rod travel at  $n = 1000^{-1}$ .

5. \*\*\* Correct the quantity of fuel injected at the correction screw of the ALDA aneroid box. Max. correction  $\pm 0.75$  mm control-rod travel.

6. Pin projection =  $16.65 \pm 0.1$  mm

7. Shutoff check: Operate the fuel-injection pump at  $n = 200 \text{ min}^{-1}$ . Force the control rod through the spring-loaded idle stop. The resulting control-rod travel must be max. 5 mm.

8. Test the pneumatic shutoff: Control lever in idle position. Operate the fuel-injection pump at  $n = 375 \text{ min}^{-1}$ . At 450 mbar (338 mmHg) (vacuum) the control rod must move briskly to control-rod travel 0 mm.

9. Control-lever range idle - full load =  $38 - 42^{\circ}$ .

Testoil-ISO 4113

# Test Specifications Fuel Injection Pumps ② and Governors

En

PE 6 P 110 A 720 RS3005 RQ 250/1100 PA 410R

supersedes -  
company Scania  
engine DS 11

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $3,30-3,40$  mm (from BDC)  
 $(3,25-3,45)$

Rotational speed rev./min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> /100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1100	12,3	13,5 - 13,7	0,4(0,8)			2,5±0,1** (max.2,2-2,9)
225	+ 0,1 5,8-6,0	0,6 - 2,0	0,2(0,4)			
600	- - - -	C, 4 - 5	0,6(1,0)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Checking of slider PRG check		Full-load speed regulation				Idle speed regulation				Torque control					
①		Setting point		Test specifications		④		Setting point		Test specifications		⑤		③	
rev./min 1	Control rod travel mm 2	rev./min 3	Control rod travel mm 4	Control rod travel mm 5	rev./min 6	rev./min 7	Control rod travel mm 8	rev./min 9	Control rod travel mm 10	rev./min 11	Control rod travel mm 12				
700	15,6-16,4	700	16,0	11,3	1145-1160	225	5,9	100	min.7,5	-	-				
				4,0	1230-1260			225	5,8-6,0						
1100	15,6-16,0							330-390	= 2,0						
1400	0 - 1														

Torque-control travel on flyweight assembly dimension a =  mm

Speed regulation: At

1 mm less control rod travel

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery on governor control lever Test oil temp. 40°C (104°F)		Control rod stop	Fuel delivery characteristics		Starting fuel delivery idle speed	
②		③a	③b		⑥	
rev./min 1	cm <sup>3</sup> /1000 strokes 2	rev./min 3	rev./min 4	cm <sup>3</sup> /1000 strokes 5	rev./min 6	cm <sup>3</sup> /1000 strokes/mm 7
1100	135,0-137,0 (132,0-140,0)	***	600	132,5-135,5 (129,5-138,5)	100	190-240
					225	8 - 12**
					245	6,1 mm RW dispersion max.4(7)

Checking values in brackets



Adjustment instructions:

\*\* In the case of greater scatter, change the initial tension of the delivery-valve spring accordingly.

More pretension gives more fuel delivery when idling.

\*\*\* Adjust the full-load delivery at the excess fuel stop. Preset the control lever by 3° more i.e. 1.5 mm more control-rod travel, in order that starting control-rod travel is reached.

Start-of-delivery test without -- Start-of-delivery test with  
Robo diaphragm

**Testoil-ISO 4113**

# Test Specifications Fuel Injection Pumps and Governors

WPP 001/4 MB 3,0 r

1. Edition

En

PES 5 MW 55/320 RS 16  
RW 375/2000 MW 28-2  
0 403 245 018  
1 - 2 - 4 - 5 - 3  
0 -72 -144-216-288 ± 0,50(0,75)

supersedes -  
company Daimler-Benz  
engine OM 617 A - USA  
83,0 kW(113PS)

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke **2,10 - 2,20** mm (from BDC) **21 mm** Control rod travel  
(2,05 - 2,25)

without altitude-pressure compensator

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	<b>13,6+0,1</b>	<b>5,35-5,45</b>	<b>0,25(0,3)</b>			
375	4,8-4,9	0,6 - 0,7	0,10(0,15)			
1600			0,25(0,3)			
1900			0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

Testoil-ISO 4113

## B. Governor Settings

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev/min	Rotational speed rev/min	Control rod travel mm	
1	2	3	4	5	6	7	8	
27-31	min.11	100	69	11,9-12,1	1900	12	100	20,5-21,5
	max.11	320		11,0	1980-2000	13	1600	12,9-13,1
	4,8-4,9	375		4,0	2170-2270	14	1000	13,6-13,7
	**			0,0-1,0	2330			
	-					6	Switching point 270-320(250-340)	
	-							

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery (19)		Full-load speed regulation (8a)	Variations in fuel delivery (17)		Starting fuel delivery idle		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
1900	51,0-53,0 (50,0-54,0)	1980-2000* (1970-2010)	1600	52,0-53,5 (51,0-54,5)	100	min.54,0	6,0 (12a)
					375	6,0-7,0 (5,5-9,5)	1,0 (15)
			1000	53,5-54,5 (52,5-55,5)	2180	21,0-24,0 (20,0-25,0)	2,3 (16)

Checking values in brackets

less control rod travel than in Column 2

8.81

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Testing with ALDA

Point	min <sup>-1</sup>	cm <sup>3</sup> /1000 H	RW	Pressure (absolute)
18	1000	53,5 - 54,5 (52,5 - 55,5)	13,6 - 13,7	1733 mbar(1300 mmHg)
18a	*** 1000	42,5 - 44,5 (41,5 - 45,5)	-	1067 mbar( 800 mmHg)
19	1900	51,0 - 53,0 (50,0 - 54,0)	11,9 - 12,1	1733 mbar (1300 mmHg)
12a	100	min. 54	20,5 - 21,5	1733 mbar (1300 mmHg)
15	375	6,0 - 7,0 (5,5 - 9,5)	4,8 - 4,9	896 mbar (740 mmHg)

1. Adjusting the idle

Test supersedes Section 4.1 of test instructions VDT-W-420/300  
Suppl. 2, Ed. 2.

Set the control lever to an angle of 69°. Operate the fuel-injection  
pump at 1000 min<sup>-1</sup>.

Screw in the spring retainer until a control-rod travel of 13,6 -  
13,7 mm is reached.

Set the control lever to an angle of 49°. Operate the fuel-injection  
pump at 1000 min<sup>-1</sup>. Control-rod travel 8,6 - 9,3 must be reached.

2. Adjusting the lower rated speed

Text supersedes Section 4.3 of test instructions VDT-W 420/300  
Suppl. 2, Ed. 2.

Operate the fuel-injection pump at  $n = 800 \text{ min}^{-1}$ . Take back the  
control lever until a control-rod travel of 1.0 - 1.3 mm is reached.

Testoil-ISO 4113

The resulting deflection of the control lever must be within the allowable tolerance. Fix the control lever in this position. Drive the fuel-injection pump at a speed according to Point 2 Section B of the test specification sheet. Set regulation at adjusting screw (28).

3. Adjusting the idle-speed auxiliary spring (70)

- \*\* Position the idle-speed auxiliary spring in contact as the characteristic curve levels off at  $n=520-550 \text{ min}^{-1}$ .

4. Adjusting the sensing lever

Place the control lever against the full-load stop. Operate the fuel-injection pump at  $n = 375 \text{ min}^{-1}$ . Adjust the sensing lever so that the control-rod travel is 0.1 (0.1 - 0.2) mm above the full-load control-rod travel at  $n = 1000^{-1}$ .

5. \*\*\* Correct the quantity of fuel injected at the correction screw of the ALDA aneroid box. Max. correction  $\pm 0.75 \text{ mm}$  control-rod travel.

6. Pin projection =  $16.65 \pm 0.1 \text{ mm}$

7. Shutoff check: Operate the fuel-injection pump at  $n = 200 \text{ min}^{-1}$ . Force the control rod through the spring-loaded idle stop. The resulting control-rod travel must be max. 5 mm.

8. Test the pneumatic shutoff: Control lever in idle position. Operate the fuel-injection pump at  $n = 375 \text{ min}^{-1}$ . At 450 mbar (338 mmHg) (vacuum) the control rod must move briskly to control-rod travel 0 mm.

9. Control-lever range idle - full load =  $38 - 42^{\circ}$ .

# Test Specifications Fuel Injection Pumps and Governors

En

PES 5 MW 55/320 RS 20  
RW 375/2200 MW 27-1  
Komb.-Nr. 0 403 245 015  
See page 2!

supersedes 8.80  
company Daimler Benz  
engine OM 617 USA

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $2,10-2,20$  mm (from BDC) **21 mm** Control rod travel  
 $(2,05-2,25)$   
without altitude-pressure compensator

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	<b>14,3+0,1</b>	<b>3,95 - 4,05</b>	<b>0,25(0,3)</b>			
375	7,0-7,2	0,60 - 0,70	0,10(0,15)			
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in

Checking values in brackets

## B. Governor Settings

without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel	Rotational speed	Degree of deflection of control lever	Control rod travel	Rotational speed	Rotational speed	Control rod travel	
1	2	3	4	5	6	7	9	
	mm	rev/min		mm	rev/min	rev/min	mm	
29-2	① min. 11,1	250	69	⑦ 13,4-13,6	2180	⑫ 20,5-21,5	100	
	② 7,0-7,2	375		⑧ 12,5	2280-2300	⑬ 14,0-14,2	1600	
	**	385		⑨ 4,0	2670-2730	⑭ 14,3-14,4	1000	
	③ -	-		⑩ 0,0-1,0	2950			
	④ -	-		⑪				
	⑤ 2,0	650-700				⑥ Switching point		
						250-300(230-320)		

without altitude-pressure compensator

## C. Settings for Fuel Injection Pump with Governor Mounted

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
Test oil temp 40°C (104°F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	40,0-42,0 (39,0-43,0)	2280-2300* (2275-2305)	1600	39,5-41,5 (38,5-42,5)	100	min. 52,0	6,0
			1000	39,5-40,5 (38,5-41,5)	375	6,0-7,0 (5,5-7,5)	1,0 (1,5)
					2550	14,5-20,5 (13,5-21,5)	2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Testoil-ISO 4113

1. Test sequence - Change in VDT-W-420/300  
Suppl. 2, Ed. 2

Section 4.1 - Adjust the spring retainer (compensation capsule)

New text:

Run the injection pump at  $n = 1,000 \text{ min}^{-1}$ .  
 Fix the control lever at  $69^\circ$ .  
 Using a pin wrench, turn in the spring retainer, so far that the control-rod travel is reached at  $n = 1,000 \text{ min}^{-1}$ . Pin wrench = KDEP 1064/1.  
 Measure the full-load delivery.  
 Fix the control lever at  $49^\circ$ .  
 Drive the injection pump at  $n = 1,000 \text{ min}^{-1}$ .  
 The control-rod travel must be 9.1 - 9.8 mm.

Section 4.3 changes as follows:

Drive the injection pump at  $n = 800 \text{ min}^{-1}$ .  
 Set the control lever so that the control-rod travel reaches 1.4 - 1.7 mm.  
 The control lever must lie within the permissible tolerance.  
 Move the idle stop up against the control lever and lock it there.  
 Reduce the pump speed to  $n = 375 \text{ min}^{-1}$  and release the leaf spring (32) with the lower adjusting screw (28) until the control-rod travel specified in the Test-Specifications Sheet is reached.  
 Carry on according to the Testing Instructions, taking into account that Section 4.8 no longer applies.

2. Testing of Sections A, B and C is carried out without altitude pressure compensator (ADA) aneroid box.  
 After this test has been completed, the aneroid box is refitted.

Testing the governor with the ADA aneroid box.

Pump speed	Pressure (abs. in mbar)	Reduction from the maximum full-load control-rod travel (mm)
1,000	840	1.0 - 1.2 (0.95 - 1.25)
1,000	907	0.3 - 0.6 (0.25 - 0.65)
1,000	667	2.4 - 2.9 (2.35 - 2.95)

3. Pin projection dimension =  $16.65 \pm 0.05 \text{ mm}$
4. \*\* At this pump speed, apply pressure to the control lever and increase the control-rod travel by  $0.4^{+0.1} \text{ mm}$ .  
 The idle delivery may not change.

**Testoil-ISO 4113**

5. Setting angle - Idle/full-load  $38 - 42^{\circ}$
6. Sensing-lever setting: Bring sensing lever into contact at  $n = 375 \text{ min}^{-1}$  (control lever in full-load position). Control-rod travel must be  $0.1 (0.1 - 0.2) \text{ mm}$  more than the full-load control-rod travel at  $n = 1,000 \text{ min}^{-1}$ .
7. Pneumatic shut-off check:  
Move the control lever to the idle position.  
Drive the injection pump at  $n = 375 \text{ min}^{-1}$ .  
At  $P_{\mu} = 450 \text{ mbar} (338 \text{ mm Hg})$  (vacuum), the control rod must move rapidly to control-rod travel =  $0 \text{ mm}$  position.
8. Mechanical shut-off check:  
Overcome the idle stop at the control lever.  
Drive the injection pump at  $n = 200 \text{ min}^{-1}$ .  
The control-rod travel must remain below  $5 \text{ mm}$ .

**Testoil-ISO 4113**

# Test Specifications Fuel Injection Pumps and Governors

En

PES 4 MW 55/320 RS 21  
RW 375/2200 MW 27-1  
Komb. nr. 0 403 244 008  
See page 2!

supersedes 10.81  
company Daimler-Benz  
engine OM 616 USA

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $2,10 - 2,20$  mm (from BDC) **21 mm** Control rod travel  
( $2,05 - 2,25$ )

\*\*

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (compensating valve) mm
1	2	3	4	2	3	6
1000	<b>14,3+0,1</b>	<b>3,95 - 4,05</b>	<b>0,25(0,3)</b>			
375	7,1-7,3	0,65 - 0,75	0,1(0,15)			
1600			0,25(0,3)			
2180			0,25(0,3)			

Set uniform delivery according to the values in [ ]

Checking values in brackets

## B. Governor Settings

\*\* without altitude-pressure compensator

Lower rated speed			Upper rated speed			Variations in control rod travel		
Degree of deflection of control lever	Control rod travel mm	Rotational speed rev./min	Degree of deflection of control lever	Control rod travel mm	Rotational speed rev./min		Rotational speed rev./min	Control rod travel mm
1	2	3	4	5	6	7	8	9
29±2	① min.11,1 ② 7,1-7,3 ③ ** ④ - ⑤ 2,0	100 375 385 - 650-700	69	⑦ 13,4-13,6 ⑧ 12,5 ⑨ 4,0 ⑩ 0,0-1,0 ⑪ -	2180 2280-2300 2670-2730 2950 -		⑫ 20,5-21,5 ⑬ 14,0-14,2 ⑭ 14,3-14,4	100 1600 1000
							⑥ Switching point 230-300(230-320)	

## C. Settings for Fuel Injection Pump with Governor Mounted

\*\*

Full-load delivery		Full-load speed regulation	Variations in fuel delivery		Starting fuel delivery idle		Difference
Test oil temp 40°C (104 F)							
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	cm <sup>3</sup> /1000 strokes
1	2	3	4	5	6	7	8
2180	40,0-42,0 (39,0-43,0)	2280-2300* (2275-2305)	1600	39,5-41,5 (38,5-42,5)	100	min.52,0	6,0
			1000	39,5-40,5 (38,5-41,5)	375	6,5-7,5 (6,0-9,0) 14,5-20,5 (13,5-21,5)	1,0 (1,5) 2,5 (3,0)

Checking values in brackets

less control rod travel than in Column 2

Testoil-ISO 4113



1. Test sequence - Change in VDT-W-420/300  
Suppl. 2, Ed. 2

Section 4.1 - Adjust the spring retainer (compensation capsule)

New text:

Run the injection pump at  $n = 1,000 \text{ min}^{-1}$ .  
Fix the control lever at  $69^\circ$ .  
Using a pin wrench, turn in the spring retainer so far that the control-rod travel is reached at  $n = 1,000 \text{ min}^{-1}$ . Pin wrench = KDEP 1064/1.  
Measure the full-load delivery.  
Fix the control lever at  $49^\circ$ .  
Drive the injection pump at  $n = 1,000 \text{ min}^{-1}$ .  
The control-rod travel must be 9.1 - 9.8 mm.

Section 4.3 changes as follows:

Drive the injection pump at  $n = 800 \text{ min}^{-1}$ .  
Set the control lever so that the control-rod travel reaches 1.4 - 1.7 mm.  
The control lever must lie within the permissible tolerance.  
Move the idle stop up against the control lever and lock it there.  
Reduce the pump speed to  $n = 375 \text{ min}^{-1}$  and release the leaf spring (32) with the lower adjusting screw (28) until the control-rod travel specified in the Test-Specifications Sheet is reached.  
Carry on according to the Testing Instructions, taking into account that Section 4.8 no longer applies.

2. Testing of Sections A, B and C is carried out without altitude pressure compensator (ADA) aneroid box.  
After this test has been completed, the aneroid box is refitted.

Testing the governor with the ADA aneroid box.

Pump speed	Pressure (abs. in mbar)	Reduction from the maximum full-load control-rod travel (mm)
1,000	840	1.0 - 1.2 (0.95 - 1.25)
1,000	907	0.3 - 0.6 (0.25 - 0.65)
1,000	667	2.4 - 2.9 (2.35 - 2.95)

3. Pin projection dimension =  $16.65 \pm 0.05 \text{ mm}$
4. \*\* At this pump speed, apply pressure to the control lever and increase the control-rod travel by  $0.4^{+0.1} \text{ mm}$ .  
The idle delivery may not change.

**Testoil-ISO 4113**

5. Setting angle - Idle/full-load 38 - 42°
6. Sensing-lever setting: Bring sensing lever into contact at  $n = 375 \text{ min}^{-1}$  (control lever in full-load position). Control-rod travel must be 0.1 (0.1 - 0.2) mm more than the full-load control-rod travel at  $n = 1,000 \text{ min}^{-1}$ .
7. Pneumatic shut-off check:  
Move the control lever to the idle position.  
Drive the injection pump at  $n = 375 \text{ min}^{-1}$ .  
At  $P_{\mu} = 450 \text{ mbar}$  (338 mm Hg) (vacuum), the control rod must move rapidly to control-rod travel = 0 mm position.
8. Mechanical shut-off check:  
Overcome the idle stop at the control lever.  
Drive the injection pump at  $n = 200 \text{ min}^{-1}$ .  
The control-rod travel must remain below 5 mm.

**Testoil-ISO 4113**

# Test Specifications Fuel Injection Pumps ① and Governors

VDT-WPP 001/4  
6. Edition

En

PE 6 P 120 A 320 RS 278 RQV 250-1100 PA 243 R  
PE 6 P 120 A 320 RS 298 RQV 250-1100 PA 277 R

supersedes 7.74  
company: A E C  
engine T.L. 12

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 3,4+0,1 mm (from BDC) ( + 0,15 / - 0,05 )

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	19,7 - 20,3	0,5			
600	9	8,4 - 9,6				
	15	18,6 - 20,4				
200	9	3,3 - 4,3				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

RQV..243 R

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 61	1110 1150 1200 1260	15,0-18,3 8,2-13,6 0 - 7,2 0	-	-	-	ca. 25	80 150 250 330	7,0-11,0 5,1- 8,6 1,1- 4,8 0	350 750 1110 -	3,2-3,6 4,9-5,3 8,3 -

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
1100	229,0-231,0 (227,0-233,0)	1120			100 250	23,5-25,5 1,5- 2,1		./.

Checking values in brackets

\* 1 mm less control rod travel than col. 2

### B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 61	1100 1150 1200 1260	15,0-18,3 8,2-13,6 0 - 7,2 0	-	-	-	ca. 25	80 150 250 330	7,0-11,0 5,1- 8,6 1,1- 4,8 0	350 750 1110	3,2-3,4 4,9-5,1 8,5

Torque control travel a = mm

### C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point	Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min Control rod travel mm
1	2	3	4	5	6	7	8 9
0,7 1100	bar 235,0-239,0 (233,0-241,0)	1130	0 1100	bar 210,0-215,0 (208,0-217,0)	- 250	- 13,0-23,0	

Checking values in brackets

\* 1 mm less control rod travel than co: 2

Testoil-ISO 4113

### D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing pressure - in bar gauge pressure  
increasing

Pump/governor	Setting Gauge pressure = bar	Measurement Gauge pressure = bar	Control rod travel- diminution difference mm

En

Manifold-pressure compensator setting - n = 500 r/min pressure drop in bar;

Setting 0.45-0.48 = 0.1 mm control-rod travel decrease

Measurement 0.036-0.41 = 1.1 mm control-rod travel decrease

Test sequence:

1. RQV governor according to WPP 001/4, 6th supplement!
2. Setting manifold-pressure compensator (only for pump 298 with PA 277 R):  
  
Basic setting of pump and governor without manifold-pressure compensator  
  
Mount manifold-pressure compensator: At n = 1100 and 0 bar, set full-load delivery on stop screw of bell crank.  
  
By means of pressure on diaphragm - connect compressed air - adjust stop so that more control-rod travel is achieved than is required for full-load delivery at max. charge-air pressure. Then, at n = 1100 r/min and max. charge-air pressure, set full-load delivery on stop screw in housing.
3. Manifold-pressure compensator setting, see above - correct by altering initial compression of spring, i.e. twist guide bushing of helical spring!

**Testoil-ISO 4113**

# Test Specifications Fuel Injection Pumps **(1A)** and Governors

**40**

VDT-WPP 001/4

6. Edition

En

PES 6 P 100 A 720 RS 1010 EP/RSV 300-1050 P2/366 D

supersedes

12.74(4)

company

John Deere

engine

6531 A

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,4 + 0,1 mm (from BDC)

Rotational speed rev/min	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Difference cm <sup>3</sup> /100 strokes	Control rod travel mm	Fuel delivery cm <sup>3</sup> /100 strokes	Spring pre-tensioning (torque-control valve) mm
1	2	3	4	2	3	6
1000	12	12,7-13,4	0,5			
600	9	5,6- 6,8				
	12	11,6-13,2				
200	15	17,2-19,0				
	9	4,0- 5,2				

Adjust the fuel delivery from each outlet according to the values in

**Testoil-ISO 4113**

## B. Governor Settings

EP/RSV..366 D

① Upper rated speed rev/min Degree of deflection of control lever	Control rod travel		Intermediate rated speed			④ Control-lever deflection in degrees	Lower rated speed		③ Torque control	
	mm	mm rev/min	4	5	6		rev/min	mm	rev/min	mm
1	2	3				7	8	9	10	11
ca. 43	1050	16,0	without auxiliary spring			ca. 19	300	6,0	1030	0
②a	1100	12,1				with auxiliary spring				150
	1150	7,4	300	5,7-6,3						
	1160	10,0-12,0	450	2,9-4,4						
	1200	3,1- 5,1	680	0-1						
1340	0,3- 1,0									

The numbers denote the sequence of the tests

## C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop Test oil temp. 40°C (104°F)		⑥ Rotational-speed limit Note: changed to rev/min	③a Fuel delivery characteristics		Starting fuel delivery Idle		④a Idle stop	
rev/min	cm <sup>3</sup> /1000 strokes		rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1,0	bar	1080	0,25	bar	100	160,0-180,0		
1050	147,0-151,0		550	93,0-101,0				
			XX	bar				
			0	87,0-91,0				
			1050					

Checking values in brackets

\* 1 mm less control rod travel than col 2

F21

**BOSCH**

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F21

**B. Governor Settings**

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control			
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm		
1	2	3	4	5	6	7	8	9	10	11		
ca. 38	1040	16,0	without auxiliary spring			ca. 17	400	7,2	1050	0		
	1080	11,5					200	19 - 21				
	1220	4,6					400	6,9-7,5				
	1050 ca. 11,0		with auxiliary spring				550	3,2-5,1			800	0,6-0,8
	1155 ca. 4,7						780	0 - 1			500	0,8-1,0
	1280 0,3-1,0											

**C. Settings for Fuel Injection Pump with Fitted Governor**

②b Full-load stop		⑥ Rotational-speed limitat.	③a Fuel delivery characteristics		Starting fuel delivery Idle		⑤		④a Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...)							Control rod travel mm	
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm		
1	2	3	4	5	6	7	8	9		
LDA	0,9 bar	1085-1095*	LDA	0 bar	100	160-180				
1050	142,0-144,0		550	108,0-116,0					400	21,0-27,0
750	156,0-160,0		1155	24,0- 44,0						

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

**B. Governor Settings**

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control			
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm		
1	2	3	4	5	6	7	8	9	10	11		
ca. 38	1040	16,0	without auxiliary spring			ca. 17	400	7,2	1050	0		
	1080	11,2					200	19 - 21				
	1120	5,2					400	6,9-7,5				
	1050 ca. 10,6		with auxiliary spring				550	3,3-5,1			800	0,6-0,8
	1100 ca. 4,7						780	0 - 1			500	0,8-1,0
	1280 0,3-1,0											

**C. Settings for Fuel Injection Pump with Fitted Governor**

②b Full-load stop		⑥ Rotational-speed limitat.	③a Fuel delivery characteristics		Starting fuel delivery Idle		⑤		④a Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...)							Control rod travel mm	
rev/min	cm³/1000 strokes	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm		
1	2	3	4	5	6	7	8	9		
LDA	1,0 bar	1085-1095*	LDA	0 bar	100	160-180				
1050	151,0-153,0		550	108,0-116,0					400	21,0-27,0
750	161,0-167,0		1150	24,0- 44,0						

Checking values in brackets

\* 1 mm less control rod travel than col. 2

# D. Adjustment Test for Manifold Pressure Compensator

Ppe 1010

Test at n = 500 rev/min decreasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	Control rod travel- diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
1010 / 366DR:	0,85	0,17	3,8 mm
1010 / 367DR:	0,55	0,20	-0,2 mm -1,9 mm
1010 / 370DR:	0,62	0,20	-0,2 mm -2,3 mm

Notes

(1) when n = 500 rev/min and gauge pressure = 1,0 bar (= maximum full-load control rod travel)

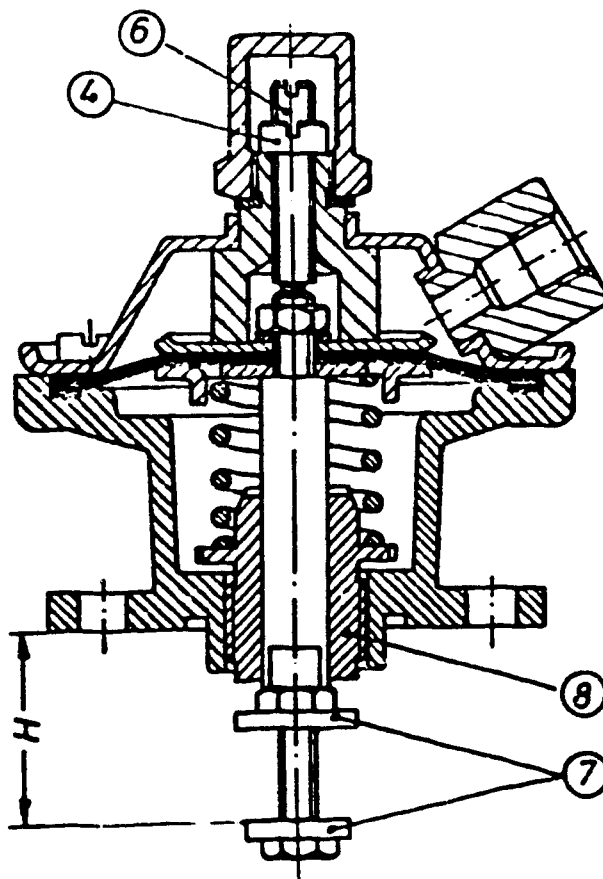
**Testoil-ISO 4113**



Test sequence:

1. Basic setting of pump and governor (Section A-B) without manifold-pressure compensator.
2. Adjust full-load delivery - delivery indication max. charge-air pressure - with full-load stop screw of governor. Measure fuel-delivery characteristics at 750 rpm; correct if necessary with torque-control retainer.
3. Pre-adjustment of manifold-pressure compensator: set dimension H - contact surface to lower stop screw (Item 7) -:  
Screw in adjusting screw in cover until this causes the diaphragm to be lifted off by 0.5 mm (delivery correction possibility during induction); counterhold screw during this operation to prevent diaphragm damage (items 4 and 6).
4. Fit manifold-pressure compensator taking care to ensure that bell crank is positioned between washers of lower stop screw. To do so, move bell crank sideways and position approx. 45° upwards. Pay attention to O-ring! As a check, actuate stop lever - full-load control-rod travel must be set. If starting travel is attained, bell crank is not properly in position. If less than full-load control-rod travel is attained, enlarge dimension H accordingly.
5. Connect compressed air - adjustment test at 500 rpm: test start and end, correct at guide bushing of helical spring. Establish control-rod-travel difference (Item 8).
6. Measure induction delivery (0 bar) - correct if necessary in accordance with Item 3!
7. Check/adjust full-load delivery, engine-speed limitation, idle and starting fuel delivery.

\* Dimension H  
370 DR = 33.3 mm



# Test Specifications Fuel Injection Pumps ① and Governors

PE 6 P 110 A 720 RS 270

RQV 250-1100 PA 240 R (1)

supersedes

9.74

250-1050 (2)

company

Chrysler, Spanien

EP/RSV 250-900P 1/389R (3)

engine

BS 36

see page 3

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke

2,8 + 0,1

mm (from BDC)

(-0,05  
+0,15)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	11,0 - 11,9	0,5			
600	9	4,0 - 5,2				
600	15	17,1 - 18,9				
200	9	2,1 - 3,1				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

250-1100 PA 240R (1)  
150-1050 (2)

## B. Governor Settings

Upper rated speed				Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	①a	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm ④	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm ③	rev/min 10	mm 11
ca. 68	1150 1220 1300 1420	15,0-17,6 9,3-13,8 2,0- 8,8 0		-	-	-	ca. 13	100 250 350 590	7,5-9,3 4,4-7,2 0,5-3,5 0	1150	8,4

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤		
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	④a	rev/min 4	cm <sup>3</sup> /1000 strokes 5b	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
(1) LDA 1100	0,9 bar 166,0-168,0 (163,0-171,0)	1120-1130* (VH ca.68)		LDA 1100	0 bar 127,0-131,0 (124,0-134,0)	100 250	310 - 330 24 - 30		
(2) 1050	166,0-168,0 (163,0-171,0)	1070-1080* (VH ca.64)		1050	127,0-131,0 (124,0-134,0)				

Checking values in brackets

\* 1 mm less control rod travel than col 2

### B. Governor Settings

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
ca. 50	900	16,0	without auxiliary spring			ca. 24	250	6,0	900	0
	950	12,0					100	19 - 21		
	1010	4,7	with auxiliary spring				250	5,7-6,3	300	1,2-1,8
②a	970	9 - 12				350	1,0-3,4			
	1050	1,0-3,2				460	0 - 1			
	1120	0,3-1,0								

### C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop		⑥ Rotational-speed limitat.		③a Fuel delivery characteristics		Starting fuel delivery Idle		⑤		④a Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...)								Control rod travel mm	
rev/min	cm³/1000 strokes	rev/min	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11	12
0,9	kp/cm²	920-930*	0	kp/cm²				250			6,0
900	162,0-164,0 (161,0-165,0)		900	130,0-134,0 (129,0-135,0)							

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Testoil-ISO 4113

### B. Governor Settings

① Upper rated speed rev/min			Intermediate rated speed			④ Lower rated speed			③ Torque control	
Degree of deflection of control lever	Control rod travel mm	Control rod travel mm rev/min				Control-lever deflection in degrees	rev/min	Control rod travel mm	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11
②a										

### C. Settings for Fuel Injection Pump with Fitted Governor

②b Full-load stop		⑥ Rotational-speed limitat.		③a Fuel delivery characteristics		Starting fuel delivery Idle		⑤		④a Idle stop	
Test oil temp. 40°C (104°F)		Note: changed to ...)								Control rod travel mm	
rev/min	cm³/1000 strokes	rev/min	rev/min	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	cm³/1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9	10	11	12

Checking values in brackets

\* 1 mm less control rod travel than col. 2

Adjustment of manifold-pressure compensator (LDA)  
(pump 270 with governor 240 and 389)

1. Basic adjustment (Section A) and governor (Section B) without LDA.
2. Attach LDA
3. Section C      Induction setting (pressure 0 kp/cm<sup>2</sup>)  
                         at bell crank of LDA.  
  
                         Charge setting (pressure 0.9 kp/cm<sup>2</sup>)  
                         with stop screw in housing.  
  
                         Engine speed - limitation - column 3
4. LDA adjustment      Control-rod-travel difference and LDA adjustment  
                         Control-rod-travel difference with stop screw of bell crank  
  
                         LDA adjustment - 500 min<sup>-1</sup> - decreasing pressure  
                         Setting      0.41 - 0.44 kp/cm<sup>2</sup> - 0.1 mm decrease in  
                         control-rod travel  
                         Measurement 0.21 - 0.26 kp/cm<sup>2</sup> - 1.5 mm decrease  
                         in control-rod travel
5. Set/measure idle and starting fuel delivery.

# Test Specifications Fuel Injection Pumps ① and Governors

WVP 001/4  
5. Edition

En

PES 6 P 110/720 RS 192 RQV 275-1050 PA 130 KR supersedes 6.75  
 .. A.. company Mack  
 .. 155 KR, 157 KR 158 KR, engine 673  
 .. 159 KR, 160 KR 203 KR,  
 272 KR

All governors = dimension B = see page ... - manifold-pressure compensator - section D, see page 2!  
 All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12	15,0 - 15,8	0,6			
600	6	2,0 - 3,0				
600	12	14,4 - 16,1				
600	15	20,0 - 21,9				
200	6	2,0 - 3,0				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1050	15,0-17,6	-	-	-	ca. 10	180	6,6-8,0	200	0 - 1,0
	1100	9,8-14,0					250	4,6-6,4	320	2,0- 2,4
	1150	4,9- 9,5					350	2,8-3,8	900	6,0- 6,4
	1260	0					450	1,9-3,2	1050	8,2
							550	0,8-2,0		
							680	0		

Torque control travel a = mm  
 RS 192 - RQV ... 203 KR

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤a		Starting fuel delivery idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
1,1	bar		1,1	bar			1000	12,1
1050	152,0-156,0	1090-1100*	800	163,0-169,0	100	134 - 154	800	12,7
			600	184,0-190,0	275	12 - 22	600	13,6
			0	bar			500	13,3
			400	141,0-149,0				

Checking values in brackets

\* 1 mm less control rod travel than col. 2

### C. Settings for Fuel Injection Pump with Fitted Governor

1

engine power Full-load delivery Control-rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation	Fuel delivery characteristics		Starting fuel delivery idle switching point		Intermediate rotational speed Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	mm
1	2	3	4	5	6	7	8	
RS ..192 - RQV ..130KR;272KR					100	134 - 154	1000	12,1
1000	152,0-156,0	1090-1100*	800	163,0-169,0	275	12 - 22	900	12,3
							800	12,7
							700	13,3
							600	13,6
							500	13,3
RS ..192 - RQV ..156KR							1000	12,0
1000	152,0-155,0		800	141,0-147,0			900	11,9
			700	135,0-141,0			800	11,7
							700	11,4
							600	11,2
							500	11,0
RS ..192 - RQV..157KR							1000	9,6
1000	101,0-105,0		700	109,0-115,0			900	9,8
							800	10,0
							700	10,1
							600	10,2
							500	10,0
RS ..192 - RQV ..1:3KR							1000	10,3
1000	112,0-116,0		700	108,0-114,0			900	10,3
							800	10,2
							700	10,2
							600	10,1
							500	10,0
RS ..192 - RQV ..159KR							1000	10,6
1000	122,5-125,5		700	127,0-131,0			900	10,6
							800	10,6
							700	10,4
							600	10,3
							500	10,2
RS ..192 - RQV ..160KR							1000	10,9
1000	128,0-132,0		800	123,0-129,0			900	11,0
							800	10,7
							700	10,6
							600	10,6
							500	10,5

Testoil-ISO 4113

**Section D - Adjustment test n = 500 r/min pressure drop - control lever to full:**

Only for 203: Setting 0.65 bar = 0.2 mm control-rod travel decrease

Measurement 0.17-0.30 bar = 2.0 mm control-rod travel decrease

Checking values in brackets

\* 1 mm less control rod travel than col 2

G5

En

G5

MACK - test-specification table and instructions1.1 T A B L E

Pump	Governor	Dimension	Test-specification sheet
PES 6 P ... 192	RQV... 130, 156, 157, 158, 159, 160, 203, 272KR	"B"	a
PES 6 P ... 192	RQV... 285KR 286KR	"PLE"	b
PES 6 P ... 192	RQV... 317, 333KR 340KR	"B" "PLE"	c
PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ...3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ...3024 3036	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mm

Test instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

2. Notes: Static check of control-rod travel - dimension B

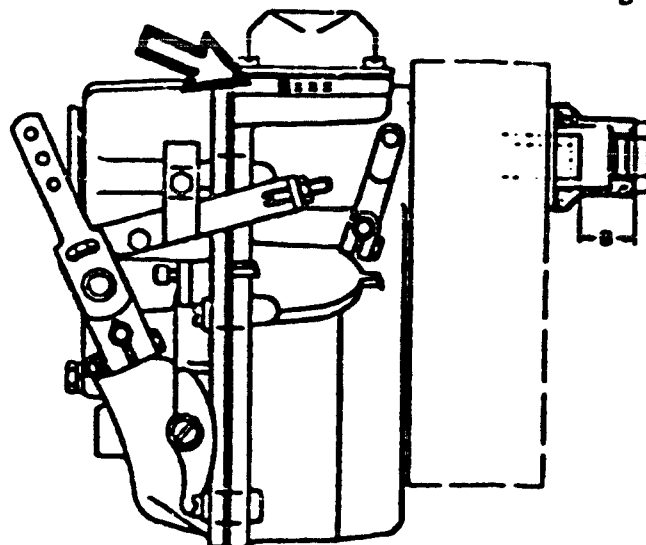
2.1 Remove closure cap.

2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.

2.3 Pull stop lever several times to "STOP" and release.  
The edge must make contact with the cam.

2.4 Measure dimension "B" and convert to "inches" as per drawing.  
Check dimension determined by actuating stop lever again and mark as per drawing (1 inch = 25.4 mm).

Example: Measured B = 20.1 : 25.4 = 1.185/1000 inches  
= mark B 1185!  
= B 1185 einschlagen!



G6

G6

En

3. Checking and marking PLE dimension

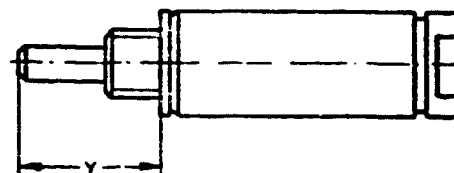
If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min<sup>-1</sup> - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be 115 - 121 cm<sup>3</sup>. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example :

Y	1.125
PLE	1.037
	<hr style="width: 50px; margin: 0;"/>
	0.088 inches



Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77



# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4  
1. Edition

En

PES 6 P 110 A 720 RS 192 RQV 300/600-1050 PA 317 KR  
... PA 333 KR  
... PA 340 KR

supersedes -  
company Mack  
engine ET 673  
(260 HP)

317 KR u. 333 KR = Dimension B  
340 KR = Dimension PLE -- see page 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,8 + 0,1 mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,7	16,9 - 17,3	0,4			
600	15,0	20,1 - 21,7				
200	6,0	2,3 - 3,1				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

.. 317 KR

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 68	1050	16,4-18,8	-	-	-	ca. 19	250	9,8-11,5	300	0,3-2,1
	1150	4,2-10,0					400	2,2- 5,2	400-550=	
	1200	0 - 5,6					700	0,8- 2,0	900	2,9-4,4
	1260	0					830	0	1050	5,8-6,2
										7,9

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤a		Starting fuel 3/4-idle idle switching point ⑥		Torque-control travel ⑤	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
1050	167,0-169,0	1090-1100*	750	165,0-169,0	275	145 - 175	1050	12,7
			500	124,0-130,0	300	14,0-23,0	750	12,7
					1150	29,0-49,0	500	10,9

Checking values in brackets

\* 1 mm less control rod travel than col 2

## B. Governor Settings

... 333 KR

c

-2-

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1050 1150 1200 1260	16,4-18,8 4,2-10,0 0 - 5,6 0	-	-	-	ca. 19	250 400 700 830	9,8-11,5 2,2- 5,2 0,8- 2,0 0	300 400-500 900 1050	0,8-2,1 2,9-4,4 5,8-6,2 7,9

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
1050	167,0-169,0	1090-1100*	750	165,0-169,0	275	145,0-175,0	1050	12,6
			500	124,0-127,0	300	14,0- 23,0	750	12,7
					1155	49,0- 69,0	500	11,0

Checking values in brackets

\* 1 mm less control rod travel than col 2

Testoil-ISO 4113

## B. Governor Settings

... 340 KR

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 68	1050 1150 1200 1260	16,4-18,8 4,2-10,0 0 - 5,6 0				ca. 19	250 400 700 830	9,8-11,5 2,2- 5,2 0,8- 2,0 0	300 400-500 900 1050	0,8-2,1 2,9-4,4 5,8-6,2 7,9

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9

Checking values in brackets

\* 1 mm less control rod travel than col 2

G9

G9 En

MACK - test-specification table and instructions1.1 TABLE

Pump	Governor	Dimension	Test-specification sheet
PES 6 P ... 192	RQV... 130, 156, 157, 158, 159, 160, 203, 272KR	"B"	a
PES 6 P ... 192	RQV... 285KR 286KR	"PLE"	b
PES 6 P ... 192	RQV... 317, 333KR 340KR	"B" "PLE"	c
PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ... 3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ... 3024 3036	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mmTest instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

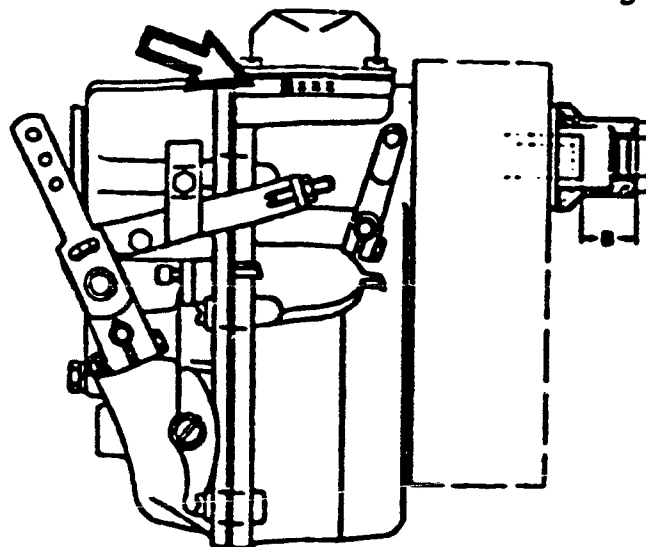
2. Notes: Static check of control-rod travel - dimension B

2.1 Remove closure cap.

2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.

2.3 Pull stop lever several times to "STOP" and release.  
The edge must make contact with the cam.2.4 Measure dimension "B" and convert to "inches" as per drawing.  
Check dimension determined by actuating stop lever again and mark as per drawing ( $1 \text{ inch} = 25.4 \text{ mm}$ ).

Example: Measured B = 30.1 : 25.4 = 1.185/1000 inches  
= mark B 1185!  
= B 1185 einschlagen!



3. Checking and marking PLE dimension

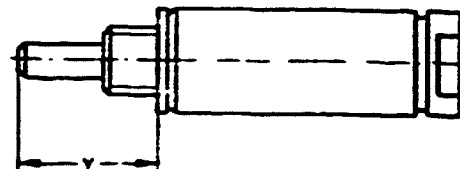
If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min<sup>-1</sup> - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be 115 - 121 cm<sup>3</sup>. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example :

Y	1.125
PLE	1.037
	<hr style="width: 50px; margin: 0;"/>
	0.088 inches



Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77

# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4  
1. Edition

PES 6 P 110 A 720 RS 192 RQV 300/600-1050 PA 285 KR (1)  
.. PA 286 KR (2)

supersedes Mack  
company ENDT 675 (1)  
engine (237 HP)  
ENDT 673 c(2)  
(250 HP)

286KE = Dimension B  
285KR = Dimension PLE -.670-.745 inch see pag. 2!

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	12,0	15,2 - 15,8	0,4			
600	15,0	19,7 - 21,7				
200	6,0	2,3 - 3,1				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

... 285 KR (1)

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever 1	rev/min Control rod travel mm 2	Control rod travel mm rev/min 3	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	rev/min 10	mm 11
ca. 66	1050	15,0-18,0	ca. 35	600	14,0-15,0	ca. 12	250	6,4-7,4	300	0,8-2,1
	1130	6,4-11,8		800	10,2-11,7		310	3,7-6,0		400
	1180	0 - 7,5		1000	4,1- 5,3		560	0,8-1,2	900	5,3-6,2
	1260	0		1100	0 - 1,5		740	0 -1,2	1050	7,9

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) 2		Rotational-speed limitation intermediate speed 3	Fuel delivery characteristics high idle speed 5a		Starting fuel delivery idle switching point 6		Torque-control travel 5	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	rev/min 4	cm <sup>3</sup> /1000 strokes 5b	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
1050	157,0-159,0	1090-1100*	800	173,0-177,0	275	145,0-175,0	1050	12,1
			500	180,0-186,0	300	14,0- 24,0	800	12,9
			PLE		1155	29,0- 59,0	500	13,2
			300	119 - 127				

Checking values in brackets

\* 1 mm less control rod travel than col. 2

G12

G12

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## B. Governor Settings

... 286 KR (2) b

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11
ca. 66	1050 1130 1180 1260	15,0-18,0 6,4-11,8 0 - 7,5 0	ca. 35	600 800 1000 1100	14,0-15,0 10,2-11,7 4,1- 5,3 0 - 1,5	ca. 12	250 310 560 740	6,4-7,4 3,7-6,0 0,8-1,2 0 -1,2	300 400-550 900 1050	0,8-2,1 2,9-4,4 5,8-6,2 7,9

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9
(2) 1050	154,0-156,0	1090-1100*	800 500	146,0-150,0 125,0-131,0	275 300 1155	145,0-175,0 14,0- 24,0 29,0- 59,0	1050 800 500	12,1 11,7 11,0

Checking values in brackets

\* 1 mm less control rod travel than col 2

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed			Intermediate rated speed			Lower rated speed			Sliding sleeve travel	
Degree of deflection of control lever	rev/min Control rod travel mm	Control rod travel mm rev/min	Degree of deflection of control lever	rev/min	Control rod travel mm	Degree of deflection of control lever	rev/min	Control rod travel mm	rev/min	mm
1	2	3	4	5	6	7	8	9	10	11

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control rod stop Test oil temp 40°C (104°F)		Rotational-speed limitation intermediate speed	Fuel delivery characteristics high idle speed		Starting fuel delivery idle switching point		Torque-control travel	
rev/min	cm <sup>3</sup> /1000 strokes	rev/min	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	cm <sup>3</sup> /1000 strokes	rev/min	Control rod travel mm
1	2	3	4	5	6	7	8	9

Checking values in brackets

\* 1 mm less control rod travel than col 2

MACK - test-specification table and instructions1.1 TABLE

Pump	Governor	Dimension	Test-specification sheet
PES 6 P ... 192	RQV... 130, 156, 157, 158, 159, 160, 203, 272KR	"B"	a
PES 6 P ... 192	RQV... 285KR 286KR	"PLE"	b
PES 6 P ... 192	RQV... 317, 333KR 340KR	"B" "PLE"	c
PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ...3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ...3024 3036	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mmTest instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

2. Notes: Static check of control-rod travel - dimension B

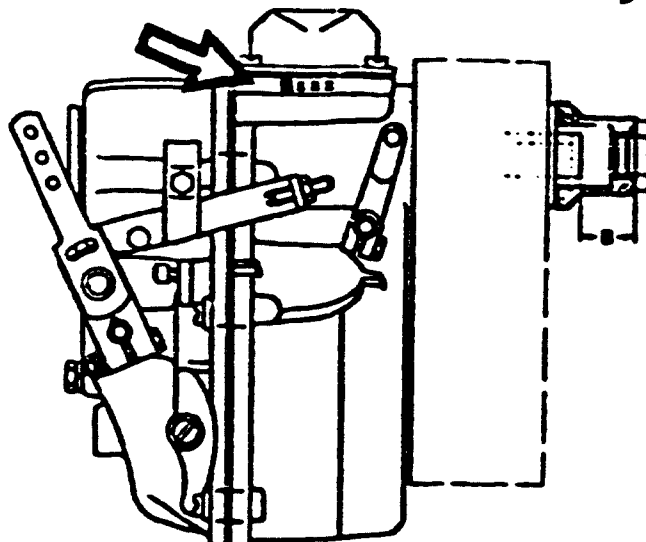
2.1 Remove closure cap.

2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.

2.3 Pull stop lever several times to "STOP" and release.  
The edge must make contact with the cam.

2.4 Measure dimension "B" and convert to "inches" as per drawing.  
Check dimension determined by actuating stop lever again and mark as per drawing (1 inch = 25.4 mm).

Example: Measured B = 30.1 : 25.4 = 1.185/1000 inches  
= mark B 1185!  
= B 1185 einschlagen!



En

G14

G14

3. Checking and marking PLE dimension

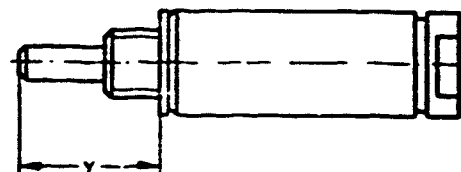
If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min<sup>-1</sup> - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be 115 - 121 cm<sup>3</sup>. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example :

Y	1.125
<u>PLE</u>	<u>1.037</u>
	0.088 inches



Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77



# Test Specifications Fuel Injection Pumps ① and Governors

WPP 001/4  
5. Edition

En

PES 6 P 110 A 720 RS3024 RQV 300/600-1050 PA342KR  
PA344KR

supersedes 3.77  
company: Mack  
engine: ETA 676 B  
(306 PS)

PES 6 P 110 A 720/3 RS3036 RQV 300/600-1050 PA365KR  
PA366KR

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke 2,35 + 0,1 mm (from BDC)  $\begin{matrix} +0,15 \\ -0,05 \end{matrix}$

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> / 100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre-tensioning (torque-control valve) mm 6
1000	14,7	21,5-22,1	0,4			
300	5,2	1,5- 2,3				

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

Upper rated speed				Intermediate rated speed			Lower rated speed			Sliding sleeve travel				
Degree of deflection of control lever 1	rev/min 2	Control rod travel mm 3	①a	Degree of deflection of control lever 4	rev/min 5	Control rod travel mm 6	④	Degree of deflection of control lever 7	rev/min 8	Control rod travel mm 9	③	rev/min 10	mm 11	①
ca. 68	1070 1150 1200 1280	15,5-18,0 6,0-11,0 0- 6,8 0		-	-	-		ca. 19	250 300 400 580 700 830	9,8-11,3 7,5- 8,5 2,5- 5,0 2,5- 2,0 0,8- 2,0 0		300 400- 900 1070	0,6-1,8 600= 3,1-3,6 5,8-6,2 8,2	
								③a						

Torque control travel a = mm

## C. Settings for Fuel Injection Pump with Fitted Governor

Full-load delivery Control-rod stop Test oil temp. 40°C (104°F) ②		Rotational-speed limitation intermediate speed ②b	Fuel delivery characteristics high idle speed ⑤b	Starting fuel delivery idle switching point ⑥	Torque-control travel ⑤				
rev/min 1	cm <sup>3</sup> /1000 strokes 2	rev/min 3	④a	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
LDA 1000	1,7 bar 217,0-219,0	1090-1100*		LDA 800 500 LDA 600 300	1,7 bar 217,0-223,0 229,0-235,0 0 bar 141,0-147,0 114 -120(PL E)	100 300	ca. 11,5mmRW ca. 5 mmRW dispersion max. 4	1050 800 700 600 500	14,7 14,8 15,0 15,4 15,0

Checking values in brackets

\* 1 mm less control rod travel than col. 2

G20

G20

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# D. Adjustment Test for Manifold Pressure Compensator

Test at n = 600 rev/min increasing pressure - in bar gauge pressure

Pump/governor	Setting	Measurement	Control rod travel - diminution difference
	Gauge pressure = bar	Gauge pressure = bar	mm (1)
S 3024 / 342KR + 344KR S 3036 / 365KR + 366KR	0,4	1,16-1,23	

Notes

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

MACK - test-specification table and instructions1.1 TABLE

Pump	Governor	Dimension	Test-specification sheet
PES 6 P ... 192	RQV... 130, 156, 157, 158, 159, 160, 203, 272KR	"B"	a
PES 6 P ... 192	RQV... 285KR 286KR	"PLE"	b
PES 6 P ... 192	RQV... 317, 333KR 340KR	"B" "PLE"	c
PES 6 P ... 352	RQV... 358KR 359KR	"B" "PLE"	d
PES 6 P ... 357	RQV... 381KR	"B"	e
PES 6 P ...3024	RQV... 326, 332KR	"PLE"	f
PES 6 P ...3024 3035	RQV... 342, 344KR 365, 366KR	"PLE + LDA"	g

1.2 Test equipment as per WPP 110/2: "S-nozzles" and tubing 6 x 1.5 x 600 mm

Test instructions for RQV-K governor W 420/303.

Following each full-load measurement, set engine speed to next measurement point and simultaneously allow graduates to run out for approx. 1 minute!

2. Notes: Static check of control-rod travel - dimension B

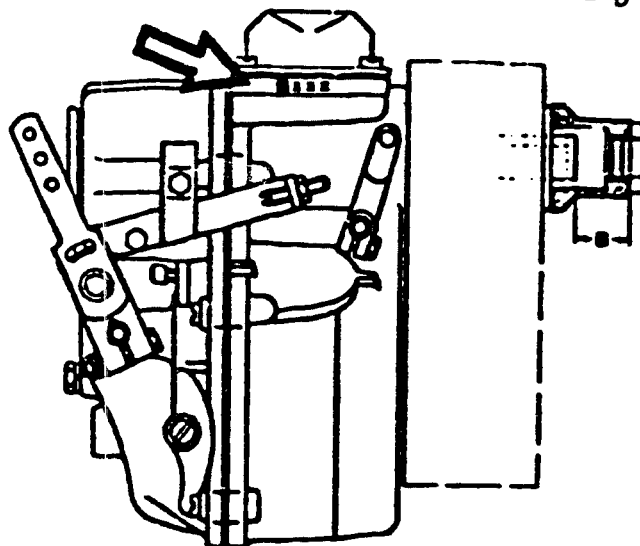
2.1 Remove closure cap.

2.2 Set control lever to "FULL" = 21 mm control-rod travel and lock.

2.3 Pull stop lever several times to "STOP" and release.  
The edge must make contact with the cam.

2.4 Measure dimension "B" and convert to "inches" as per drawing.  
Check dimension determined by actuating stop lever again and mark as per drawing (1 inch = 25.4 mm).

Example: Measured B = 30.1 : 25.4 = 1.185/1000 inches  
= mark B 1185!  
= B 1185 einschlagen!



En

G22

G22

3. Checking and marking PLE dimension

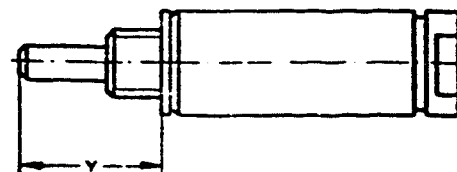
If, for some reason, there is no PLE dimension or if a complaint is received about inadequate performance and this is due to an incorrect PLE dimension, the pump is to be removed and tested on an injection-pump test bench:

1. Clamp pump on to test bench.
2. Apply at least 4.22 bar compressed air to air cylinder, so as to fully extend plunger.
3. Hold control lever on full load and run test bench at 300 min<sup>-1</sup> - pay attention to inch tolerance!
4. With 1000 strokes quantity of fuel injected must be 115 - 121 cm<sup>3</sup>. If the measured quantity is outside the stated tolerance, continue with 5; otherwise with 8.
5. Set speed to 0 and discharge air from air cylinder.
6. Remove air cylinder and fit shims if quantity is too low or remove shims if quantity is too high.
7. Attach air cylinder and repeat items 2 - 4. Repeat items 5 and 6 if quantity is still not within tolerance.
8. Set speed to 0 and discharge air from air cylinder.
9. Remove air cylinder.
10. Apply at least 4.22 bar compressed air to removed air cylinder and measure dimension "Y" of cylinder. Dimension "Y" is the distance from the contact surface of the cylinder at the end of the thread to the tip of the extended plunger rod.

Subtract PLE dimension from dimension Y and select shims which approximately correspond to result.

Example :

Y	1.125
PLE	<u>1.037</u>
	0.088 inches



Make up difference with shims.

The shims can be obtained from Mack representative.

11. Mark PLE dimension at location described - see diagram, item 2.

4.77

# D. Adjustment Test for Manifold Pressure Compensator

Test at n = rev/min decreasing increasing pressure - in bar gauge pressure

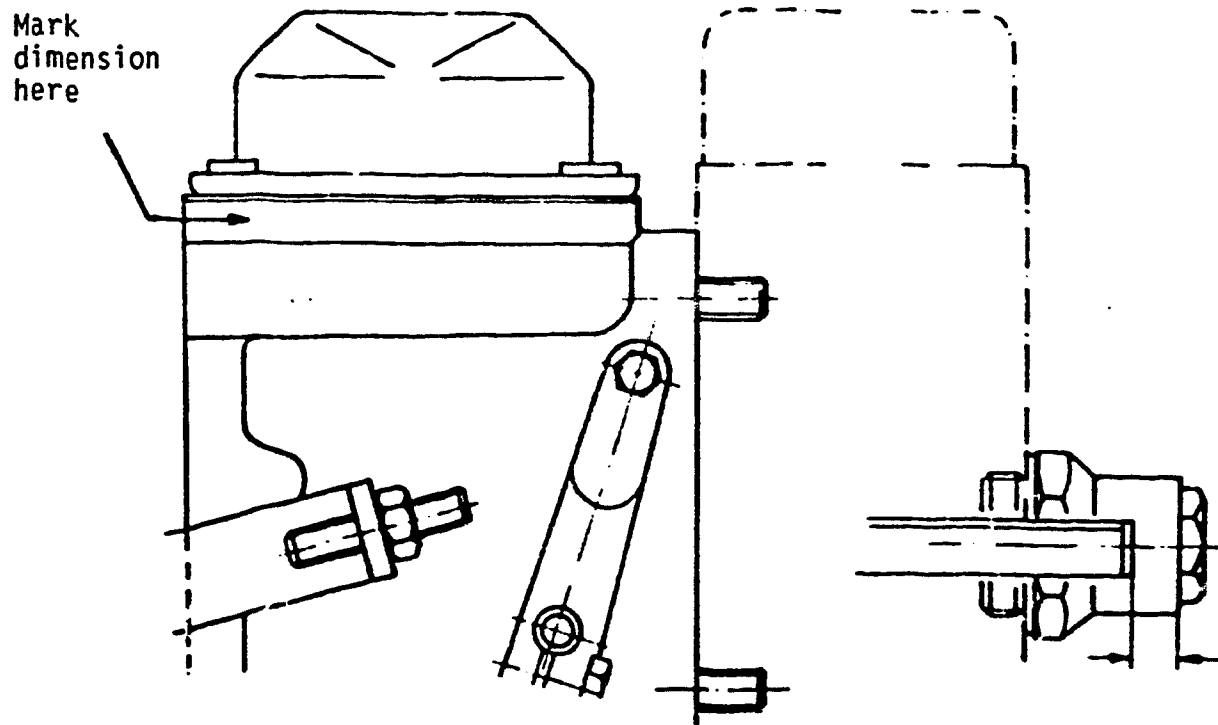
Pump/governor	Setting	Measurement		Control rod travel	diminution
	Gauge pressure = bar	Gauge pressure = bar	bar	mm	difference (1)
S 3024 / 342 KR + 344 KR	0,4				
S 3036 / 365 KR + 366 KR		1,16 - 1,23			

**Notes**

(1) when n = rev/min and gauge pressure = bar (= maximum full-load control rod travel)

**PLE measurement:**

1. Remove closure cap
2. Set at n = 300 min<sup>-1</sup> with control lever = 115-121 cm<sup>3</sup>/1000 strokes.
3. Measure distance as shown, convert to inches and mark (1 inch = 25.4 mm)



# Test Specifications Fuel Injection Pumps (1A) and Governors

# 40

WPP 001/4 MB 11,4 1 4

1. Edition

En

PES 6 P 110 A 820 LS 442 RSV 350-750 P 1/487

supersedes

company Daimler-Benz  
engine OM 407

All test specifications are valid for Bosch Fuel Injection Pump Test Benches and Testers

## A. Fuel Injection Pump Settings

Port closing at prestroke  $\begin{matrix} 3,2-3,3 \\ (3,15-3,35) \end{matrix}$  mm (from BDC)

Rotational speed rev/min 1	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Difference cm <sup>3</sup> /100 strokes 4	Control rod travel mm 2	Fuel delivery cm <sup>3</sup> /100 strokes 3	Spring pre tensioning (torque control valve) mm 6
730	11,7+0,1	11,9-12,1	0,4(0,8)			
350	7,3-7,5	1,1- 1,9	0,4(0,7)			

Adjust the fuel delivery from each outlet according to the values in

Testoil-ISO 4113

## B. Governor Settings

1 Upper rated speed rev/min Degree of deflection of control lever 1	Control rod travel		Intermediate rated speed			4 Control-lever deflection in degrees 7	Lower rated speed		3 Torque control	
	Control rod travel mm 2	Control rod travel mm rev/min 3	4	5	6		rev/min 8	Control rod travel mm 9	rev/min 10	Control rod travel mm 11
loose	800	0,3-1,0	-	-	-	-	-	-	-	-
ca.	x =	2,5								
	10,7	750-755								
2a	4,0	785-795								
	850	0,3-1,7								

The numbers denote the sequence of the tests

## C. Settings for Fuel Injection Pump with Fitted Governor

2b Full-load stop Test oil temp 40°C (104 F)		6 Rotational-speed limit Note changed to ) rev/min	3a Fuel delivery characteristics		Starting fuel delivery 5 Idle		4a Idle stop	
rev/min 1	cm <sup>3</sup> /1000 strokes 2	3	rev/min 4	cm <sup>3</sup> /1000 strokes 5	rev/min 6	cm <sup>3</sup> /1000 strokes 7	rev/min 8	Control rod travel mm 9
730	119,0-121,0 (116,0-124,0)	750-755*	-	-	100	130,0-150,0		

Checking values in brackets

\* 1 mm less control rod travel than col 2

4.82

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H1

-1